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Vol. XX, No. 11 NOVEMBER, 1931

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

TRADE MARK

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THE 80th ANNUAL MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION WILL BE HELD IN TORONTO, CANADA, IN 1932—August 22nd–27th, Royal York Hotel, Headquarters, R. B. J. Stanbury, 43 Victoria St., Toronto 2, Canada, Local Secretary.

The 1932 Meetings of the American Association of Colleges of Pharmacy, the National Association of Boards of Pharmacy, Conference of Pharmaceutical Association Secretaries, of the Pharmaceutical Law Enforcement Officials and the Plant Science Seminar will also be held in Toronto.

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THE 1932 MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

QUEBEC AND THE MARITIMES.

QUEBEC and the Maritime Provinces, the former renowned for its historic interest and old-time customs, are famous for their natural beauty. Thousands of miles of good roads provide ideal conditions for the motor tourist.

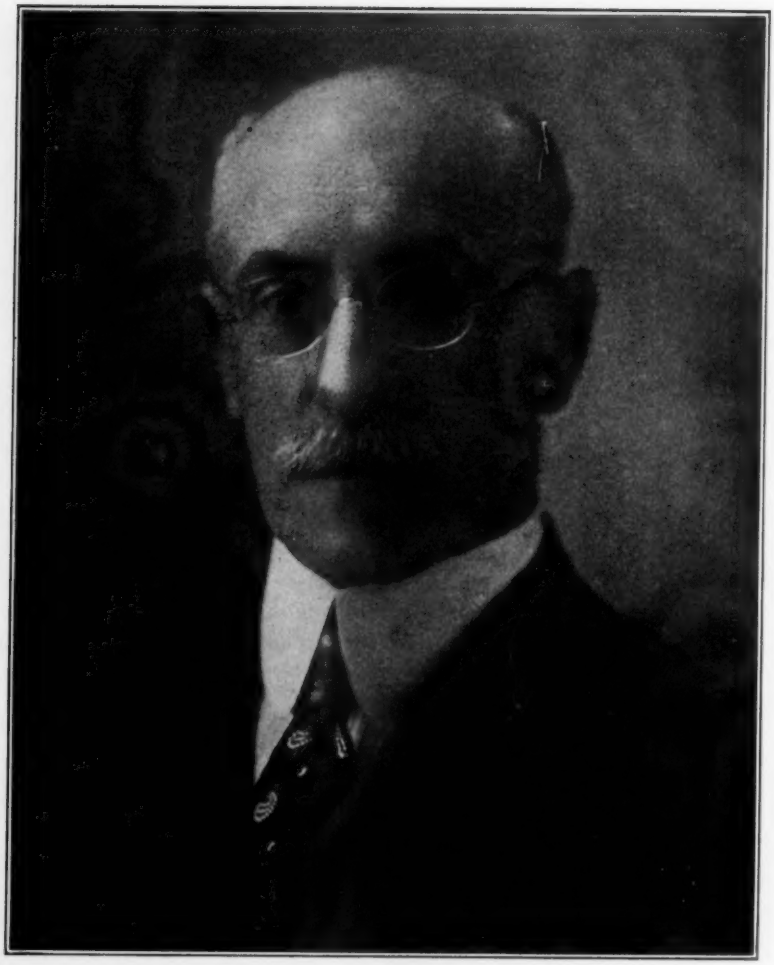
Of the many attractions which Quebec holds for the visitor, one of the most interesting is the atmosphere of Old France, which permeates the whole province. The manners, customs and language of the people, their quaint white-washed houses, narrow fields, monastaries and wayside shrines, stir the imagination, as can no other section of America.

Prince Edward Island, the smallest province of the Maritimes, also the whole Dominion, is easily accessible, despite its apparent isolation. Car and passenger ferries maintain regular service, and the trip from the mainland to the island can be made in short time.

Nova Scotia is the most easterly province of Canada and it is connected with New Brunswick, to the west, by an isthmus of only fifteen miles in width. Good motor roads through New Brunswick connect Nova Scotia with the New England States, thereby making the province easily accessible to the American motorist.

Millions of acres of land in the eastern provinces, with lakes and rivers that are well stocked with fish, are open to everyone. Salmon, ouananiche, brook trout, lake trout, bass, maskinonge, pike and pickerel are plentiful in certain sections.

For the benefit of members of the AMERICAN PHARMACEUTICAL ASSOCIATION who will attend the convention at Toronto and propose to make the trip by automobile through Quebec or the Maritime Provinces attention is drawn to the fact that the National Development Bureau of the Department of the Interior, at Ottawa, has offered to coöperate in the supplying of road maps and other useful information to enquirers.—Address F. C. C. Lynch, Director.



GEORGE ARNOLD BURBIDGE.

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL. XX NOVEMBER, 1931 No. 11

THE PRESIDENT OF THE CANADIAN PHARMACEUTICAL ASSOCIATION.

The 1932 meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION and of the Canadian Pharmaceutical Association will bring together the pharmacists of two neighboring countries. The twenty-fifth annual meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION was held in Toronto, and the silver anniversary of the Canadian Pharmaceutical Association will be celebrated in Toronto, jointly with the 80th anniversary meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION. There are six members living, now members of the ASSOCIATION, whose membership dates back to 1877 or earlier: John Uri Lloyd, Cincinnati; Henry S. Wellcome, London, England; Eugene A. Carrell, Morristown, N. J.; Edward Dawson, Syracuse, N. Y.; Wilbur F. Horn, Carlisle, Pa.; I. H. Shurtleff, New Bedford, Mass.

George Arnold Burbidge, honorary member of the AMERICAN PHARMACEUTICAL ASSOCIATION and president of the Canadian Pharmaceutical Association, 1931–1932, celebrated his 60th birthday this year. After graduation from Halifax high school, he matriculated into Halifax Medical College and, thereafter, engaged with Brown Bros. & Co., wholesale and retail druggists of Halifax. In 1889, he passed the examination of the Pharmacy Board and became manager of the retail department of Simson Bros., Halifax. For thirty-six years he served as a member of the Council of Nova Scotia Pharmaceutical Society; as its treasurer, 1897–1902; vice-president, 1903–1904; president, 1905–1906 and secretary-registrar since 1907. He was a member of the first Council of the Canadian Pharmaceutical Association and vice-president and, since 1924, chairman of the Council; he was elected to the presidency in 1923 and again in 1931. In 1908, Mr. Burbidge became lecturer in Pharmacy in Nova Scotia Technical College and, in 1911, was elected lecturer in Pharmacy of the newly-formed Maritime College of Pharmacy, in affiliation with Dalhousie University. Since 1922, he has held a professorship and deanship of the Pharmacy Faculty. He disposed of his retail pharmacy in 1922.

Dean Burbidge affiliated as member with the AMERICAN PHARMACEUTICAL ASSOCIATION in 1922 and has attended a number of its annual meetings. The esteem for him of the members was expressed by his election as honorary member at the Miami meeting. (See page 846, August JOURNAL, page 1002, September number and page 1127 of the October issue.)

THE GEORGE WASHINGTON BICENTENNIAL CELEBRATION.

The illustrations above show views at Fort McHenry, Baltimore—Star Fort Gate, the Water Battery, Patapsco Battery, view from the Bay, Outer Gate. Above the first Washington Monument, Baltimore; statue of Francis Scott Key (The Star Spangled Banner). Insert, half-tone of James E. Hancock, chairman of the first of the celebrations of the George Washington Bicentennial.

EDITORIAL

E. G. EBERLE, EDITOR 10 West Chase Street, BALTIMORE, MD.

PHARMACEUTICAL PUBLICITY.

THE methods of publicity of associations, and of branches of the AMERICAN PHARMACEUTICAL ASSOCIATION have frequent consideration in the JOURNAL. Recently, occasions have suggested new ideas and officials have put them into practice; contact and mutual interest of physicians, the public and pharmacists result in helpful publicity.

The Pennsylvania Pharmaceutical Association arranged a display at the Scranton meeting of the State Medical Association for acquainting physicians with the products of the U. S. Pharmacopœia and National Formulary. Likewise, the Virginia Pharmaceutical Association had a display at the Roanoke meeting of the Medical Society of Virginia of U. S. P. and N. F. products. The interest developed at the convention of the American Medical Association, under the direction of the AMERICAN PHARMACEUTICAL ASSOCIATION, and the evident desire of physicians to acquire a knowledge relative to materia medica of their own selection will have an effect and influence on prescription practice throughout the country. (See comment of Adley B. Nichols in August JOURNAL, page 742.) These exhibits at State meetings bring the message nearer home and the coöperative efforts at these conventions make district and local coöperation along these lines possible. The first step is closer relationship with physicians; those who have taken part in national and state displays will gladly communicate suggestions to others—it is one of the many opportunities stimulated by the formation of the Conference of Pharmaceutical Association Secretaries. (See also U. S. P. and N. F. Propaganda by O. U. Sisson, September JOURNAL, page 965.) Illustrations of the exhibits will be found elsewhere in this issue, together with further information regarding them. Your attention is also invited to "Plans for Institute Work in Iowa" by Secretary J. W. Slocum.

Pharmacy Week programs were pronounced successes nearly everywhere and so long as the professional thought directs, these annual occasions will be welcomed by the public and physicians. The directing thought should be that outlined in the "History of Pharmacy Week" by Robert J. Ruth, printed in July JOURNAL, page 696. Pittsburgh had a five days' celebration to which the public generally, including physicians and students, were invited and the response was most gratifying; further reference is made under "Local Branches."

The schools and colleges of pharmacy, equipped for making window displays, held to the educational motif, showing departments devoted to pharmacy, drug-yielding plants of the section in which the display was made, etc. Another window treated only one official item—phenol—in acquainting the public with the products derived therefrom, the therapeutic properties, application in public health activities, the dangers of handling it by those not qualified and who look upon it only as something to sell at a profit. The windows also instilled a better understanding of the practice of pharmacy, of the educational requirements, the service and protection given the public by qualified pharmacists. The educational maps have

heretofore been explained; as an informative effort and map printing the work was a success; likewise, as background of the display in the window, but in the reductions necessary for a photograph and still greater reductions in illustrations for magazines, the pictures do not show to advantage. Further deductions will be made in the legends under half-tones.

Window displays and pharmaceutical exhibits have a value, if there is an idea back of them to be conveyed to the public. Some of those featuring displays in drug stores are possessed with the thought that the people know drugs and medicines are sold and dispensed within and that items for display should be of merchandise from which greater profit-producing results can be expected. The purpose of this comment is not to discuss that phase, *but to point out the value of displays*—which acquaint the public with the importance of pharmaceutical education and service, the dangers in purchases of medicines from the unqualified, because below or above standard, indifferently put up or stored; sources of drugs, apparatus used in manufacturing, essentials of care and cleanliness—*that you are intensely interested in the conservation of public health.*

OPENING OF THE WASHINGTON BICENTENNIAL CELEBRATION.

OPENING the Washington Bicentennial Celebration at Baltimore, 1500 public school children planted 152 cherry blossom trees at Fort McHenry, a tree for each public school in Baltimore. The program was carried out under the chairmanship of James E. Hancock, a pharmacist, member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1907, son of a pharmacist—the late John F. Hancock, president of the AMERICAN PHARMACEUTICAL ASSOCIATION, 1873–1874, member of the ASSOCIATION for sixty years, from 1863 until his demise in 1923.

As president of the Society of the War of 1812 in Maryland, Mr. Hancock presided over the ceremonies. The trees are the gift of Wilbur D. May and the presentation was made by Dr. David E. Weglein, superintendent of Public Schools. Colonel Alvin K. Baskette, third corps area U. S. A., who has been in charge of restoring the fort, accepted the trees. In his remarks Colonel Baskette stated that the fort should not be considered a playground but should be visited in reverence, as a shrine to keep patriotism alive.

The ceremonies were under the auspices of the National Society, Daughters of the Revolution. Among other speakers, besides those mentioned in the foregoing, were: John H. Ferguson, representing Mayor Jackson; former Mayor, James H. Preston, chairman of the Bicentennial Committee for Baltimore; Jerome Stern, representing Mr. May; Mrs. Eugene J. Grant, national regent, Daughters of the Revolution. The invocation was delivered by Rev. George H. Buck, chaplain of Maryland Society Sons of the American Revolution. The children, accompanied by the Municipal Band, which furnished the musical program, sang "The Star Spangled Banner" and saluted the flag, which could be seen above the ramparts. The celebration was impressive and the program well arranged and carried out accordingly. The fact that Baltimore was the first city to erect a Washington monument made its selection as first, fit in the schedule of the celebrations which will continue through a twelve-month period. It is also the birthplace of a national flag and of the National anthem.

PROCEEDINGS OF THE CELEBRATION OF THE 300TH ANNIVERSARY OF THE FIRST RECOGNIZED USE OF CINCHONA.*

THE table of contents of this publication includes an introduction by Anton Hogstad, Jr., an address of welcome by Dr. George T. Moore, Director of the Garden, and the following technical contributions: "Three Centuries of Cinchona," by Leo Suppan; "The Chemistry of Cinchona Historically Considered," by Edward Kremers; "The Medicinal Use of Cinchona," by George Dock; "Dr. John Sappington, Pioneer in the Use of Quinine in the Mississippi Valley," by Robert J. Terry; "Cinchona Culture in Java, Its History and Development," by M. Kerbosch; "Minor Alkaloids of Cinchona Bark," by Frederick Rosengarten; "The Cinchona Alkaloids in Medical Science," and especially, "The Quinine-Malaria Reaction as a Touchstone of Chemo-Therapy," by Torald Sollmann; "The Rôle of Quinine in the Cure of Malaria," by Kenneth F. Maxcy.

This is a botanical work of a very unusual character and of a high order. To bring together in one volume a summary of the taxonomic labors of so many eminent botanists as have written on Cinchona, including extensive field observations as well as herbarium studies, to follow with a detailed history of the behavior of the plants under cultivation in foreign countries, to discuss the pharmacognosy of their products, their chemical constituents and the variation of these in the several species and under varying treatment, their relations to human disease and their economic history, was an undertaking as wisely conceived as it has been successfully executed. The only serious omission is that of a study of the cultivation of the trees in the midst of their native forests, an omission that contributes not a little to the failure to have solved some of the problems that have been raised in the discussions recorded. The result of this series of contributions is to supply a volume of monumental importance, and one that will serve as a storehouse of information for all time.

Although every article included in this book is a masterpiece, the contribution of Suppan is entitled to special commendation. It is probably the best historical account of the development of our knowledge of Cinchona that exists in print. Most writers on this subject have been content to abstract and comment on such works as Markham's "*Peruvian Bark*," but this paper of Suppan's shows evidence of extensive and intense study of the technical literature of his subject, and an easy familiarity with it. He is not so fortunate, however, in his later pages, wherein he deals with the species and commercial products. It appears that his descriptions are mostly taken from his authors and that his decisions do not evidence personal familiarity with the things themselves. It is still more unfortunate that, in reaching his conclusions, he has neglected to take advantage of the evidence supplied by the South American plantations. In fact, this, which is in some respects the most informative portion of the whole Cinchona history, is not even mentioned. We note the following items of special interest in his admirable work.

The persistence of the evil results of Weddell's unfortunate, although temporary, misinterpretation of the relations of *C. Josephiana* is very notable in Suppan's discussion. So far as economics are concerned, these results were early eliminated

* Held at the Missouri Botanical Garden, St. Louis, October 31–November 1, 1930. Published by the Missouri Botanical Garden. Pages 258. Price $5.00.

by the abandonment of the cultivation of that species, but scientific records as to taxonomy, pharmacognosy and chemistry are still littered with errors based on the examination of materials that originated in that obtrusive plant or of hybrids that developed from it in the Eastern plantations. It is unfortunate that Suppan, in the presentation of a historical work that is destined to exert great influence for a long time to come, did not improve his opportunity for the correction of this basic mistake, and thus terminate its farther extension. No more significant statement could be made than that which appears on page 89: "up to 1860, Dr. de Vry had obtained only 0.4% alkaloids from *Cinchona Calisaya* an analysis which was confirmed by Mr. Howard. Both declared it an inferior species. This was unfortunate, for the species was a hardy one, and as it required less care than the others, it has been extensively propagated." "Up to 1860," was the very period when *C. Josephiana* was being cultivated under the name "*C. Calisaya*," and no other species present there at that time could have given this low yield. It is also the species that is "hardy," and easily cultivated, which is not at all true, relatively considered, of *C. Calisaya*. On page 118, Suppan gives a fairly good description of this bark, but makes the astonishing statement that it was "medicinally not inferior to the genuine." Coming to *C. ovata*, var. *rufinervis* Wedd., which is in fact the most tomentose form of that species, Suppan refers to its bark as *Cascarilla Carabaya*, and quotes Weddell's statement that it was extensively used to adulterate the true Calisaya. This has always been true, even after cultivation had removed all reasonable excuse for the substitution. A typical *C. ovata* bark could scarcely be mistaken for that of *C. Calisaya* in mature condition, because the former is nearly smooth externally, while the latter is reticulately fissured and is much thicker. Calisaya bark, when young, is not fissured, and may wrinkle longitudinally in drying, in which condition one can easily be mistaken for the other. The extent to which the spurious bark was substituted by the collectors may be judged from the following occurrence. On arrival at Sorata, all bark packages were opened and each quill was examined separately by an expert. Originally, the spurious bark was destroyed as encountered, but the brilliant idea occurred to the largest buyer, of storing the rejected bark, insuring it at full value as though genuine, and having it burned to secure the insurance. It is recorded that a quarter of a million dollars was thus fraudulently obtained.

On page 119, Suppan says of it, "That *Carabaya Bark* was perhaps derived from *C. ovata* var. *B. rufinervis*, which in Peru is called *Cascarilla Carabaya*, or from the variety *a vulgaris*, as Weddell suggested, or from any variety of *C. ovata* at all, is uncertain. Pereira says that it was first imported into London in 1846, and that it came from Carabaya." This uncertainty of Weddell was explained and dissipated by information subsequently gained in Bolivian plantations, where I have seen innumerable trees showing every degree of variation, from those which were almost pure *Calisaya* to others that were almost pure *ovata*. It could not be otherwise than that a number of varieties, some referred to one and some to the other species, should have been proposed by those who did not know of the parental origin of the forms.

Suppan's excellent description of these barks gives evidence of perplexing variability in their characters.

As to Weddell's *morada* and *verde* varieties, mentioned on page 115, the explanation is entirely different from that of hybridity. Both forms are abundant and

conspicuous in the plantations, but there never has been any explanation offered for their occurrence. They have a common origin, it is said, even from the same seed pod, and the seed of either will produce both forms. Some workmen thought that they could distinguish the two by the appearance of their bark, but I was not able to satisfy myself positively that this was so. Neither did there appear to be any difference in their alkaloidal content, although there have been conflicting statements in regard to this. It was not so with the *zamba* (black) variety which had a characteristic appearance and was of superior quality. It had a strong resemblance to Ledger bark, and always suggested to me the possibility, if not probability, of a hybrid origin between that and *Calisaya*. It appears to be what Weddell has called *C. Calisaya*, var. *microcarpa*.

Suppan's reference on page 65 to the value of the length of the stamens in classification records a view that had to be abandoned (as was similarly true in the case of *Erythroxylon*) when it became known that Cinchona is very subject to dimorphism and even trimorphism, a structure that is responsible for the ready hybridization of the species.

Various references are made to published statements that Cinchonas were found in the vicinity of Honda, Columbia and also in the vincinity of Bogota. While not able to offer a positive statement on this subject, it seems to me very unlikely that the genus occurs in either of these places. The related genus *Remijia* is abundant there, and it seems probable that its two species were mistaken for Cinchonas. Suppan, by the way, overlooks the presence of quinine in *Remijia* bark, when he says that quinine does not occur in any of the related genera.

Kerbosch's "History of Cultivation in Java" brings into review the principal facts of this history, in so concise and so practical a way as to leave the reader with a clear picture of the course of events in that connection. Although there are enlightening references to Cinchona cultivation in British India, these references are not so numerous or full as they might have been made, in the interest of a better understanding of the author's own subject, Even in the matter of his own history he sometimes leaves the picture slightly deficient in detail, and in one instance, actually misleading. Some of his conjectures regarding botanical relationsh.p do not appear justified by observations made in the native homes of the species. His views, briefly stated, are as follows: That from a genetic standpoint, *Cinchona Ledgeriana* is the original of what may be called the Calisaya group; that *C. Calisaya* itself is a hybrid of *Ledgeriana* with another species, probably *C. Josephiana;* that *C. Calisaya* has a number of forms or varieties which vary perceptibly in "botanical" characters and from 2% to 6.9% in alkaloidal content.

These deductions, it must be remembered, were based on observation of the plants as they grew in the Oriental plantations. None of the eminent botanists who studied the plants in their native home offered these particular suggestions, which appear quite inconsistent with facts of my knowledge. *Cinchona Calisaya* is in fact the most definitely characteristic of all the species that I have known in the field, with the possible exception of *C. Josephiana*. If it could be a descendent of *C. Ledgeriana* at all, it would be so by variation and not through hybridity. If a hybrid plant, it would undoubtedly grow associated with one or both of the parents, while if a variety, it would be more likely to have a distinct range of its own, and this is in fact the case. *Calisaya* grows in the northern part of Bolivia and adjacent

Peru, while *Ledgeriana* has a distinctly southern range, notwithstanding that the two overlap. That *C. Josephiana* should be one of the parents of *Calisaya* is specially improbable, both on the ground of physical characteristics, and because of the very distinct altitudinal distribution of the two. It is difficult to see how there could be any general mixing of *Josephiana*, a straggling shrub of high, dry, sunny hillsides, with a large tree like *Calisaya*, growing in the deep forests of the lower ranges. So far as appearances indicate, the *Ledger* tree might much more easily be a hybrid of *Josephiana* and *Calisaya* than for the case to stand as suggested by Kerbosch. However, this view also is opposed by the facts as to range of the two species and by their relative alkaloidal content.

Coming to the so-called varieties of *Calisaya* in the Java plantations, which proved so perplexing in regard to their variable alkaloidal content, I note that precisely the same condition was observed in the Bolivian plantation, but in the latter case the matter was fully explained. This explanation was not merely suggested, but it was abundantly proved; that the lower yielding forms were not "varieties" of *Calisaya*, but clearly hybrids of that species, mostly with *C. ovata*, the latter being regarded as the "weed" of Bolivian *Cinchonadom*, a hybridization which it was found impossible to prevent in the Bolivian plantations, no matter how carefully the process of seed production might be guarded. These views regarding botanical relationship, which Kerbosch has accepted, belong to the early literature of the subject, and were based on very fragmentary evidence. The evidence afforded by the Bolivian plantations, which has supplied the key to correct interpretation, appears to have been greatly neglected by those engaged in the study under review. In no case has Bolivian cultivated bark, proceeding from trees definitely identified as pure *Cinchona Calisaya*, and those barks similarly identified by pharmacognostic methods, shown any such variation in alkaloidal content as that above quoted. Barks so identified have been fairly uniform in their yield of approximately four or five per cent of alkaloid. The entire literature of alkaloidal content of bark supposed to be from *C. Calisaya* and showing such wide variation of content, has been based on false assumptions of botanical identity. In all cases of Bolivian cultivated barks, where the identity could be established, the low-yielding barks have been proved to be of hybrid origin.

Kerbosch omits all mention of the greatest of all mistakes made in connection with Cinchona cultivation, namely, that of stocking the Oriental plantations with *C. Josephiana*, in the belief that it was a variety of *C. Calisaya*. This mistake was originally made by Weddell, in 1849, but ten years later, when he realized the enormous losses that had been sustained, especially in British India, as a result of acting on this belief, he corrected his mistake and unqualifiedly declared this plant to be a distinct species.

In his enumeration of the botanists in Bolivia who contributed to the development of Cinchona culture in Java, Kerbosch has omitted to emphasize, or even to mention, the position that was taken by Charles Ledger toward the mistaken operations of his associate and chief. It would be a great injustice to this man to perpetuate the neglect of Markham, in his history of Cinchona, to record the fact that the latter persisted in the view that the worthless *Josephiana* was a variety of *Calisaya*, and, on that basis, almost confined his collection of plants and seeds to that species, in spite of Ledger's protests. It is true that Ledger was a merchant

and laid no claim to a professional status in botanical work. Nevertheless, he was an ardent lover and a keen observer of plants and his knowledge of the various Cinchonas of the Bolivian forests, among which he had long resided, was superior to that of any of the visiting botanists. His commercial operations, moreover, had included trading in Cinchona bark, and he had accumulated much evidence as to the superiority of certain kinds and the worthlessness of others. As Kerbosch says, Markham himself was not a botanist and should have given heed to the advice of one with the information that Ledger possessed. The history of Markham's operations contains unmistakable evidence that in his descent of the eastern Andean slope he encountered *Cinchona Josephiana* long before reaching the highest level at which *Calisaya* grew and that, relying on Weddell's opinion, he collected seeds and plants of this species in large quantity. We learn farther that after having visited the region where other species grew, he stopped again on his return and increased his collection of *C. Josephiana*.

With no definite evidence as to the fact, it is easy to see the great probability that hybridization of either *Calisaya* or *Ledgeriana* with *Josephiana* would be almost certain to occur in the British and East India plantations, where the latter species had been planted to the number of hundreds of thousands.

From a personal point of view, I cannot do less than point out that in 1887, I presented to the American Association for the Advancement of Science a careful account of the cultivation of Cinchona in Bolivia, which was also published in the *Pharmaceutical Record* of October 1st of that year. The paper was illustrated by abundant herbarium specimens of all the species and forms that I could find there, and by long quills of trunk-bark and wood sections, all of which material is still available for study. As a result of later studies, conducted at the Kew Herbarium, I found it necessary to correct some of my former conclusions, the most important of them being the substitution of the name *Cinchona Josephiana* in nearly all places where that of *C. amygdalifolia* occurs. It now seems desirable to reprint that article with such changes as have been indicated by subsequent study.

It is theoretically true that absolute knowledge of hybrid origin can be secured only by experimental pollination, but in cases like the present, in which thousands of plants are produced under conditions known to favor the crossing of two particular species, and the progeny shows every indication of such origin, the conclusion amounts to practical certainty.

That the Ledger species is subject to the same probabilities of hybridization is indicated by Kerbosch's statement, "In any case, it is certain that the plants obtained from the imported seeds of *C. Ledgeriana* were far from being homogeneous," and he proceeds to show that two distinct variations were found among these plants. This evidence agrees exactly with the experience of the Bolivian planters. One of them showed me a tree of typical *Ledgeriana* which he had planted in an angle of his house, where it was protected so far as possible from the access of foreign pollen, and which he preserved for the production of seed. But he declared that all his precautions could not entirely prevent cross-pollination, and that the seedlings derived from this tree would have to be carefully purged of hybrids before being transferred to the plantation. That hybridization has occurred between *Calisaya* and *Ledgeriana* is also very probable, and Kerbosch gives testimony in support of that supposition, but this, it must be remembered, is a very different

thing from saying that *Calisaya* is not a true species, being a hybrid between *Ledgeriana* and *Josephiana*.

Kerbosch has paid a high tribute to the service performed by Markham, but he might have gone much farther in his eulogy of that remarkable man, without incurring danger of being charged with exaggeration. His journey into the Cinchona forests involved all the sufferings and dangers that are familiar to those who have read accounts of the life and labors of the Cinchona collector, but difficult as was this journey, it was made under comparatively favorable conditions as to beasts of burden, guides and assistants, regularly traveled roads and trails, comfortable shelter at night and a supply of food amidst friendly people. Little did Markham realize, as he made that journey, that on his return he was to be deprived of all these comforts and of most of the barest necessaries of life, pursued by enemies, with other enemies lying in wait, encumbered with the precious but troublesome bundles of living plants, and compelled to find a new way through the jungles and over the snowy peaks, in order to avoid watched trails and known passes. The present writer, who has made the transit of the Andes eight times, at different points, has found his journeys difficult and exhausting enough under the best of conditions, and he would be appalled beyond expression at the prospect of being compelled to make the journey over unknown routes, without food and shelter, and with scanty clothing to protect against the frightful cold of those Alpine summits.

The contributions of Sollman and Maxcy are of absorbing interest, but quite disappointing in their revelation of the fact that we do not yet know just how quinine acts in causing the patient to recover from malaria. They do eliminate the idea of a "specific" nature of the cure, as the term is ordinarily used, and show that the quinine, instead of acting altogether directly on the germ, promotes the ability of the body to fight its own battle. This again demonstrates the importance of general systemic treatment and justifies faith in the helpfulness of many remedies on which we depended before quinine and cinchona were known.—H. H. RUSBY.

Phenol window display, University of Minnesota College of Pharmacy.

SCIENTIFIC SECTION

DETERIORATION OF CERTAIN MEDICAMENTS UNDER THE INFLUENCE OF LIGHT.

BY H. V. ARNY, ABRAHAM TAUB AND ABRAHAM STEINBERG.

(*Continued from p. 1023, October* JOURNAL.)

PECULIARITIES OF THE INDIVIDUAL CHEMICALS.

Adrenalin Hydrochloride.—While amber bottles are the only type that preserve the solution when cork stoppers are used, ampuled solutions keep under all light conditions for a period of one year.

Apomorphine Hydrochloride solutions deteriorate even in the dark. Ampuled solutions darken if air is above the liquid. When CO_2-filled, the ampuled solutions keep under all light conditions.

Benzoic Acid keeps perfectly in amber-glass containers during exposure to direct daylight during a period of one year. In bottles of other colors and in colorless containers discoloration begins within six months. In diffused light, samples keep without discoloration for over one year, regardless of the color of the container.

Betanaphthol.—In direct daylight, all samples in all types of containers were discolored within two months of exposure. In diffused light, and stored in amber A and B and in Green B containers the chemical was not discolored after one year of exposure.

Chloroform.—Amber A and B and Green B containers afforded protection in direct daylight for a period of twelve months. Other types of bottles were less effective. In diffused light, all containers preserved the chemical over a period of twelve months.

Ephedrine Hydrochloride solutions in cork-stoppered containers will not keep except when stored in the dark. Darkening, however, is evidently due to oxidation. Ampuled solutions keep under all light conditions.

Ether.—No type of transparent container kept the two U. S. P. samples of this chemical studied by us longer than two months when exposed to direct daylight. In most cases after two months of storing in cork-stoppered bottles the samples had evaporated. Again, we note that even under these severe conditions Amber A and B and Green B containers afforded the most effective protection. In diffused light, samples stored in Amber A and B and Green B containers kept perfectly for one year.

Ferric Citrate.

Ferric Phosphate, Soluble.

Ferric Pyrophosphate, Soluble.

All three of these scale salts of iron changed color after exposure to direct daylight for one month, regardless of the type of glass container used. In diffused light, Amber A and B and Green B preserved ferric pyrophosphate for over one year; Amber A and B preserved ferric phosphate for one year; whereas ferric citrate after exposure for six months in any container became darker in color.

Stored in the dark in any container the color of these salts remained unchanged during the year of observation.

Hydriodic Acid, Diluted.
Hydriodic Acid, Syrup.
Hydrobromic Acid, Diluted.

These three products, all of the quality prescribed by U. S. P. X or U. S. P. IX, maintained their full halogen content even after one year of exposure to direct daylight or to diffused light. In the case of diluted hydrobromic acid, no darkening resulted from exposure to light. The iodide preparations did darken in direct daylight; all samples darkening between the fourth and sixth months of exposure except in the case of flint glass and the amber containers where the sample of the acid remained colorless for about twelve months. The syrup exhibited the same peculiarities as syrup of ferrous iodide, which will be discussed below.

Hydrocyanic Acid, Diluted.—This product exhibited peculiarities which were quite puzzling until our experiments finally convinced us that loss in cyanide content was not due to light, but to volatilization.

Mercuric Iodide kept perfectly for one year all under conditions of light exposure and when stored in all types of glass containers used by us.

Mercuric Oxide, Red.—None of the type containers studied afforded this chemical protection against direct daylight or diffused light. Within one month, all of the samples had darkened. Storage in the dark is the only practical means of preservation.

Mercuric Oxide, Yellow.—In direct daylight, all samples in all types of glass containers used, darkened within one month of exposure. In diffused light, Amber B and Green B containers preserved the chemical for over one year.

Mercurous Chloride.—In direct daylight, calomel remained unchanged in color for one year when stored in Ambers A and B and Green B containers. Stored in the other containers darkening took place within one month. In diffused light, no darkening occurred to the chemical, when stored in any of the containers used; even after exposure for one year.

Mercurous Iodide.—The light-sensitivity of this salt is known to all chemists and our study of this erratic chemical is worthy of a special paper. At this time we will summarize our findings as follows: (*a*) Under all conditions of light in all types of containers studied, the salt darkens within one month; (*b*) It keeps perfectly for twelve months or more when stored in the dark; (*c*) The blackening is a surface phenomenon only and the black film protects the inner layer of chemical from the light; (*d*) A sample kept in diffused light and shaken from time to time eventually developed some indications of the red tint of mercuric iodide; (*e*) Assay of said sample, however, indicated but little change in the HgI content of the gray and the reddish portions; (*f*) No indications could be noted of the presence of free iodine in the darkened samples.

Phenol, Liquefied.—The first sample obtained and observed for one year exhibited erratic behavior. A second sample observed for six months was stable under all conditions. The latter product is popularly supposed to contain a stabilizing catalyst.

Physostigmine Salicylate solutions act in an erratic fashion. They are fairly stable when stored in ampuls with CO_2 atmosphere.

Pyrogallol.

Resorcinol.

These chemicals, exposed to direct daylight, keep well for about one year when stored in Amber A and B and Green B containers. In diffused light, they keep for one year or more in any of the containers used by us.

Santonin, when exposed to direct daylight turns yellow in less than two months when stored in any of the glass containers we used. In diffused light, Amber A and B and Green B containers preserved the chemical in a colorless condition for one year or more.

Silver Nitrate.—In all cases where darkening occurs, gray specks begin at the top. It is claimed that chloride-free silver nitrate does not turn gray and our observations confirm this statement. The darkening (when occurring) is apparently partly due to traces of chlorides absorbed from the air. Light seems to play an unimportant rôle, since the control samples kept in the dark turned gray as quickly as those samples exposed to diffused light. As to the preservative action of colored glass, samples stored in Amber A and Green A and B containers kept perfectly for 12 months in diffused light.

Silver Proteins.—Samples of both the "strong" and "mild" varieties were studied with careful checkings of the pAg value of the solutions when fresh, when kept in the dark and when exposed to direct daylight in the various types of glass containers used by us. Our figures indicate that little or no change in silver-ion concentration occurs, since the pAg remains fairly constant over a period of one year. However, from the standpoint of physical appearance, solutions should be stored in amber containers, as slight depositions of metallic silver were noted on the walls of the other types of bottles after four months' exposure to direct daylight.

Solution of Arsenous and Mercuric Iodide.—Careful work on this solution has recently been reported by Rosin and by Husa. Our conclusions may therefore be condensed to the bare statements: (*a*) That even when stored in the dark, the solution is unstable; (*b*) That in diffused light, amber containers afford the best protection; (*c*) That yellow color, due to free iodine, does not appear until practically all of the arsenous iodide is converted into the arsenic form.

Solution of Chlorinated Soda.—Even when stored in the dark, this solution loses about one-third of its active chlorine content within twelve months. The same solution stored in Amber A and B and in Green B containers in direct daylight lost ten per cent within one month; while all samples stored in other glass containers lost from fifty to eighty per cent during the same period. In diffused light, all of the samples (except those in flint glass) kept about as well as the samples kept in the dark. This would seem to indicate that deterioration in the case of this solution is due to volatilization.

Solution of Chlorine, Compound.—This notoriously unstable product decomposes with great rapidity when exposed to direct daylight and even when stored in the dark it loses about one-third of its chlorine content within two weeks. On the other hand, *chlorine water* prepared by saturating distilled water with the gas, keeps its full strength for six months when stored in the dark. This type of

solution is decomposed by direct daylight regardless of the type of container in which it is stored.

Solution of Hydrogen Dioxide.—Two samples were studied during a year. "A" states upon the label that it contains $^1/_5$ grain of acetanilid per ounce. "B" is free from acetanilid but we understand that it does contain traces of a stabilizing catalyst. "A" stored in Amber B container exposed to direct daylight kept its strength for two months. Stored in other types of bottles it deteriorated within one month. "B" stored in Amber A and B and Green B containers in direct daylight retained its strength for two months. In diffused light, Amber A proved the best container. Both solutions deteriorated slowly when stored in the dark; the H_2O_2 loss in both samples when stored in the dark one year being less than 10 per cent.

Spirit of Ethyl Nitrite.—Much work was performed on this pharmaceutical. Amber bottles kept it for from one to two months when exposed to direct daylight, whereas in the dark the loss in nitrite was about sixteen per cent in twelve months. In diffused light, figures obtained were so erratic that we are inclined to the belief that deterioration is due to evaporation of the nitrite rather than to the influence of light. We were also unable to find much difference in deterioration between samples made by dissolving the nitrite in Alcohol U. S. P. or in absolute alcohol.

Sulphurated Potassa.—Although the color of the sample had changed from liver-brown (when freshly prepared) to greenish yellow, after exposure to air for a few hours and although it remained this green-yellow color after one year of exposure to direct daylight, all samples at the end of the year kept within the U. S. P. assay requirements. Light seemed to play no part in this color change; for deterioration (as to color) went on in the dark as well as in sunlight regardless of color of glass container. We therefore believe that the deterioration is an oxidation rather than a light phenomenon.

Syrup of Ferrous Iodide is the subject of a special paper read by us at the 1931 meeting of the New York State Pharmaceutical Association. As in the case of the hydriodic preparations mentioned above, the iodide content remained constant through twelve months, regardless of light conditions or type of glass container. The darkening of this syrup is due to the action of the hypophosphorous acid mistakenly added as a preservative. This chemical does preserve the syrup for two or three months, after which it assumes a permanent brown color. Samples made without hypophosphorous acid turn brown within a few days, but exposure to sunlight for a few hours restores its original green color.

Thymol Iodide.—None of the types of glass containers used protected this chemical from deterioration from direct daylight although those samples stored in Amber A and B and Green B containers remained unchanged for four months. Stored in the dark, the color of the product remained unchanged during a period of over one year. In diffused light, samples stored in all of the glass containers except flint glass kept as well as those kept in the dark.

EXPERIMENTS WITH STABILIZERS.

In the case of the following chemicals the influence of certain stabilizers was studied.

TABLE IX.

Chemical (or preparation).	Stabilizers tried.
Betanaphthol	Citric acid, terpin hydrate, stannous chloride, colloidal copper, colloidal tin oleate
Ether	Colloidal copper, colloidal tin oleate tin foil plus copper gauze
Ferric citrate Ferric phosphate, soluble Ferric pyrophosphate, soluble	Sodium citrate, sodium biphosphate, stannous chloride, terpin hydrate, colloidal copper, colloidal tin oleate
Hydriodic acid, diluted	See betanaphthol
Mercuric oxide, red	See betanaphthol
Mercuric oxide, yellow	See betanaphthol
Mercurous iodide	See betanaphthol
Phenol	Sodium sulphite. Also see betanaphthol
Pyrogallol	See betanaphthol
Resorcinol	See betanaphthol
Solution of arsenous and mercuric iodide	See betanaphthol
Solution of hydrogen dioxide	See betanaphthol
Solution of chlorinated soda	Saccharin, sodium chloride
Spirit of ethyl nitrite	Sodium carbonate, calcium chloride "Mollit" and "Anhydrone"

These stabilizers were picked more or less at random from chemical preservatives suggested in the literature. None gave satisfactory results in our hands except the well-established facts that tin compounds stabilize phenol and that acetanilid is a fairly satisfactory preservative for solution of hydrogen dioxide. It is an interesting fact, however, that stannous chloride exerts a distinct stabilizing influence on peroxide solutions.

OTHER COLORED GLASSES.

Our investigation was planned for a study of *glass containers which are actually available in the American market*, hence the study of special types of colored glass in sheet form scarcely belonged in our field of work. However, during the past few years there has been placed upon the market standard types of colored glass and as spectro-photometric readings indicated that glass of red tint should be the best protection for light-sensitive chemicals, we devoted a small portion of our time to this problem. The six "Corning color filters" selected were (*a*) "Pyrex" (*b*) "Nultra" (*c*) Lantern Blue (*d*) "Noviol" (*e*) Sextant Green and (*f*) Heat-resisting Red. These were fitted as "windows" to small "cameras" so that light could penetrate only through the glass plate. The chemicals in the pyrex test-tubes, already described, were placed within these "cameras" and were then exposed to direct daylight for a period of four months when the "cameras" were opened and the chemicals were either assayed or examined as to color changes.

Table X gives the results of this study.

TABLE X.—CORNING FILTERS.

(4 Months' Exposure.)

Chemical.	Glass preventing deterioration.
Betanaphthol	Red and green
Ferric citrate	Red and green
Ferric phosphate, soluble	Red and green
Ferric pyrophosphate, soluble	Red and green

TABLE X.—*Continued.*

(4 Months' Exposure.)

Chemical.	Glass preventing deterioration.
Hydriodic acid, diluted	All
Mercuric oxide, red	Red
Mercuric oxide, yellow	None
Mercurous iodide	None
Phenol	Red and green
Pyrogallol	Red, green and "Noviol"
Resorcinol	Red, green and "Noviol"
Santonin	Red and green
Solution of chlorinated soda	Red and green
Solution of hydrogen dioxide	Red, green and "Noviol"
Spirit of ethyl nitrite	Red, green and "Noviol"

BIBLIOGRAPHY.

Dr. Steinberg's dissertation gives a bibliography of 197 titles. Limitations of space prevent our publishing it in this article.

CONCLUSIONS.

(1) Spectral transmission curves of the eight samples of glass containers used as well as six samples of Corning glass filters are given.

(2) Reports are made on the deterioration of 35 chemicals and preparations stored in seven of the types of containers mentioned above under the following conditions: (*a*) exposed to direct daylight, (*b*) exposed to diffused light, (*c*) kept in a dark closet in "dark room." Since Amber C container closely resembled Amber B container, it was not used in all of our work.

(3) These exposure tests indicated that Amber A and B and Green B containers were the best protectives for light-sensitive chemicals. The other bottles used afforded poor protection against light rays.

(4) Of the 35 chemicals and preparations studied, all did not deteriorate because of the action of light. Other factors were: (*a*) Atmospheric oxidation: examples, apomorphine hydrochloride, sulphurated potassa and phenol. (*b*) Evaporation: examples, spirit of ethyl nitrite and diluted hydrocyanic acid. (*c*) Other atmospheric impurities: example, silver nitrate.

(5) Direct sunshine was very destructive to light-sensitive chemicals. In diffused light (resembling drug store conditions) the deterioration was much less (one-third to one-twelfth); in fact, with most chemicals, not much more than when the chemical was kept in a dark place.

(6) Reports on the protective action of certain stabilizing catalysts and of special types of colored glass are given.

COLLEGE OF PHARMACY,
COLUMBIA UNIVERSITY,
July 25, 1931.

EXPLORING ECONOMIC PLANTS.*

BY ERNST T. STUHR.[1]

Few fields create as much interest and offer as much fascination and satisfaction as does the exploration of the marvels and mysteries of economic plant life.

The dynasty of drug plants dates back to the days of the forefathers of prehistoric life. There is little doubt that the evolution of many plants into present-day forms has been greatly facilitated by the advent and progress of all worldly

* This paper is an elaboration of part of a comprehensive survey of the native plant resources of the Pacific coast. Scientific Section, A. PH. A., Miami meeting, 1931.

[1] Department of Pharmacology and Pharmacognosy, School of Pharmacy, Oregon State College.

things. Plants adapt themselves to surroundings. The competition for existence is often a severe ordeal for the survival of the fittest—from the simplest and smallest of plant life (bacterias, molds, yeasts) to the most highly developed and largest, as giant trees, et cetera. The present existing plants are the result of the slow, patient methods of Nature. Past achievements form the most dependable test of possibilities inherent in coöperation between the slow and patient methods of Nature and the phenomena of life.

The presentation of facts of interest with the production of medicines is timely, because of an increasing desire on the part of the public for a deeper insight into scientific and professional subjects, as well as an attempt to combat the many erroneous beliefs and fallacies which generally prevail regarding the various phases of the drug realm.

The compiling of this material was undertaken primarily to stimulate in the public, as well as in the druggist and medical practitioner an interest concerning the possibilities of the resourcefulness of the native plant life of the Pacific coast region from an economic viewpoint. Usually the time allotted to the subject of plant preservation and cultivation is somewhat limited. Realizing the great value of time and the primary desire of the public for concise information, the criterion has been to preserve the essential known facts regarding the respective plants in existence.

It will not be possible within the space allotted for this article to name the large number of medicinal plants occurring throughout this vast coast region. In order to make this list of drug plants more nearly complete, introduced and cultivated plants have been included along with the native wild growing plants. However, since this is a virgin field from the standpoint of scientific investigation of medicinal plant resources, it may be interesting to mention in the form of a résumé or synopsis, the results obtained from covering the plant kingdom.

It is to be noted from the following summary of this vast compilation that a surprisingly large number of economic plants thrive within the boundaries of the coastal states.

SUMMARIZATION OF SURVEY.

For the Coast Region.

Total number of plants considered, which possess or may be of medicinal value, 1153
Number of plant families considered, 155
Exotic (introduced) and cultivated plants, 505
Plants requiring study and investigation, 518
Official drug plants, 196

For the State of Oregon.

Total number of existing plants considered, which possess or may be of medicinal value, 533
Introduced and cultivated plants, 178
Plants requiring study, 246
Official drug plants, 109

This is a field, which to the author's knowledge, had not hitherto been investigated, wherefore the above results are of marked interest to not only the Pacific coast states, but to pharmacognosists throughout the country. This investigation was conducted in coöperation with the Bureau of Plant Industry, Washington, D. C., and the Oregon State Experiment Station, Corvallis, Oregon.

Cascara, Digitalis, and Hops in Oregon.

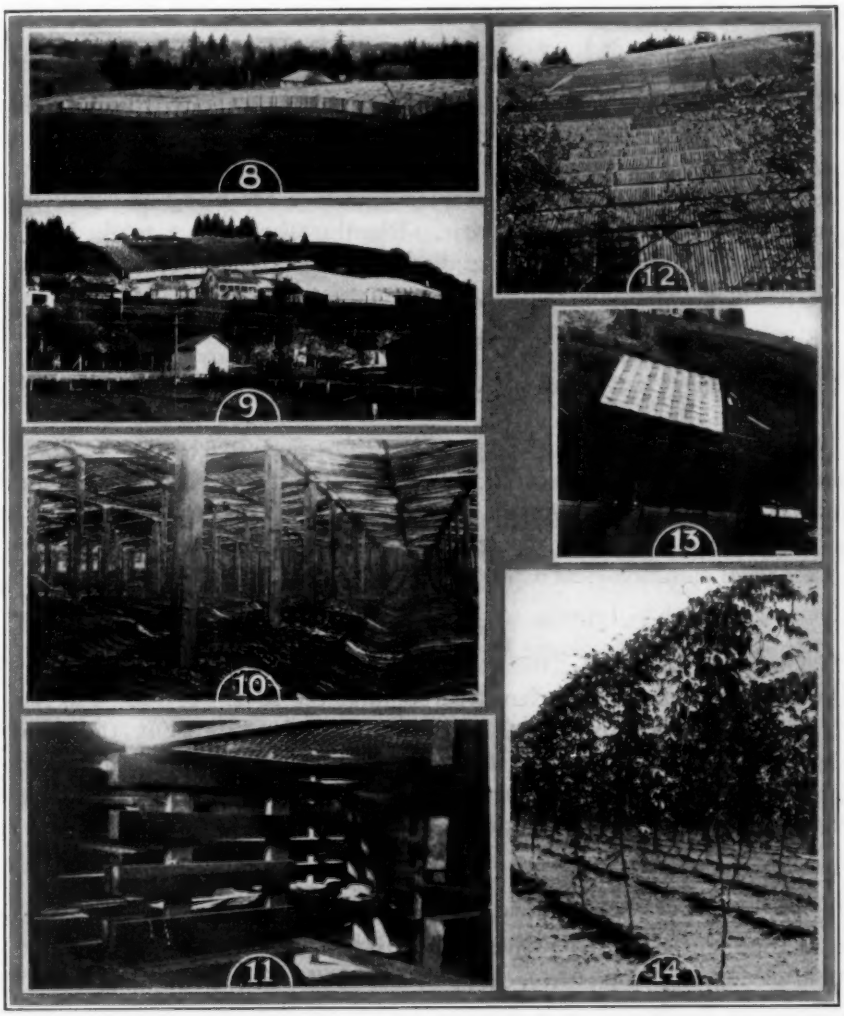


Fig. 1.—Eight-acre plot, one-year old seedlings. In background four-year old grove of Cascara. Fig. 2.—Native Oregon Digitalis—Wastelands and roadsides of Lincoln County, Western Oregon. Fig. 3.—Native Oregon Digitalis growing wild in Western Oregon. Fig. 4.—Digitalis growing along fence rows; coast region, Lincoln County, Oregon. Fig. 5.—Close-up section of three-year old Cascara planting. Fig. 6.—Cascara plantings, three-year old trees. Fig. 7.—Digitalis in wooded and open areas; coast region of Western Oregon. Fig. 8.—Ginseng sheds (P. M. Stamp). Fig. 9.—Hillside project (Posson & Midford). Fig. 10.—Interior of lath house. View of fresh plantings (P. M. Stamp). Fig. 11.—Ginseng drying room (Osborne). Fig. 12 and Fig. 13.—Lath house covering hillside (John Osborn). Fig. 14.—Hop yard view near Salem, July 1930.

The varied flora of the region is very impressive, which can only be expected considering the number of native medicinal plants growing wild. In consideration of the foregoing points it is hoped that the presenting of this article might bring some small amount of benefit to those interested in the native plant life of the Pacific coast.

EXCERPTS OF POSSIBLE COMMERCIAL DEVELOPMENTS.

SOME COMMERCIAL ASPECTS OF CASCARA PLANTINGS.

The romance of cascara, *Rhamus purshiana*, D. C., is indeed very fascinating, and interest has been manifested in this native tree of the Pacific coast area through the investigations of Starker[1] and his associates.

Several experimental plots of cascara plantings are being undertaken in the Willamette valley at the present time. Plantings have been made from seeds, as well as from seedlings with the result of thriving trees as shown by the accompanying pictures. The commercial prospects are promising to date.

GINSENG CULTURE.

Much has been written about this ancient Chinese herb and former U. S. P. drug (*Panax* 1870).

The Oriental lore and the apparent healthy price secured for the dry root as acclaimed by Fritts[2] have created extensive interest of prospective commercial growers throughout western Oregon and Washington. Investigations point toward a possible increase of Ginseng plantings in the Pacific Northwest, which is reputed to possess ideal climatological aspects for this "orient-famed" drug.

GOLDENSEAL.

Hydrastis canadensis, L., the golden root-bearing plant, an exotic plant to the Northwest, has commanded interest throughout the ages.

Numerous prospective plantings are reported throughout the immediate Northwest country, centering in the Skagit Valley of Washington. Goldenseal culture is without a doubt pronounced successful as evinced by the extensive investigations of Langenhan[3] and associates.

DIGITALIS.

The possible remuneration which might be benefited from a native plant, which grows so abundantly as *foxglove* in western Oregon, is worthy of mention.

The accompanying pictures, taken by the author in the coast region of Oregon, are convincing evidences of a possible future project and worthy industry for development in the great Pacific Northwest.

THE WILLAMETTE VALLEY HOP INDUSTRY.

The Cultivation of *Humulus Lupulus*, L.

The cultivation of hops, *Humulus Lupulus*, L., has developed into an extensive industry in the Willamette valley and immediate regions. Large acreages are devoted to hop growing. The farming communities in the Salem territory are possessed with large hop yards, as indicated by the accompanying views, and numerous dryers.

According to reports released by the Oregon State Experimental Station a number of young hop plants have been received from England, for use in hop-

[1] *Amer. Jour. of Pharm.*, 103 (1931), 73.
[2] *N. A. R. D. Jour.*, Oct. 23 (1930), 213.
[3] Jour. A. Ph. A., Vol. XIX, No. 4 (1930), 349.

breeding work. The plants are of a new variety resistant to the downy mildew disease, which is threatening the hop-growing industry of the Willamette valley.

EXCEPTIONAL OPPORTUNITIES AND POSSIBILITIES FOR DEVELOPMENT OF FUTURE CRUDE DRUG SUPPLY.

The importance of this work has been greatly emphasized in recent years by our dependence upon European countries for crude drugs and by the rapid disappearance of our native medicinal plants. At present, it is impossible to give adequate information for the successful cultivation of even some of our native medicinal plants, which grow wild about us. Hence, the experimental cultivation of plants is imperative for the future supplies of the essential crude drugs.

Many universities and institutions have begun to cultivate medicinal plants with reference to the economic aspect. The possibility of cultivating some of the existing wild medicinal plants on a commercial basis should be of vital interest and importance to all who have the drug industry and its future development at heart.

The development of the natural plant resources of the Pacific Northwest will lead toward a great future industry for which nature has prepared the foundations, with exceptional and superior natural advantages, as soil and climate.

The author is confident that the Northwest section of the country could eventually become the leading producer of crude drugs.

INFLUENCE OF PERIOD OF VEGETATION AND DEVELOPMENT OF PLANT ON THE ALKALOIDAL CONTENT OF HYOSCYAMUS NIGER L.*

BY ZDENEK F. KLAN.[1]

A study is here presented of the alkaloidal content of the different parts of this important drug plant during the various stages of its growth and development. Extensive tables are given showing the quantitative alkaloidal content with a qualitative differentiation as to whether it is chiefly atropine, hyoscyamine, scopolamine, tropine or scopoline.

Among many valuable conclusions it was found that (1) with the growth of the germinating plant the quantity of alkaloids in its organs decreases and that (2) in the order of their alkaloidal content the parts of the plant are as follows: root (both of annual and biennial plants), flowering tops, fruits, leaves and stems.

INTRODUCTION.

Literature records many studies dealing with the observations on alkaloids in pharmacologically important *Solanaceæ*, of which the chief subject of research has been *Atropa Belladonna* and in the second place *Datura Stramonium*. The authors have given very little attention to the not less important species *Hyoscyamus niger*. The majority of published investigations refer mostly to the quantitative determinations of alkaloids of commercial drugs official in pharmacopœias in order to ascertain their value, the greater number deal with histochemical observations of the localization of alkaloids in tissue, with the influence of selection on the alkaloidal content with quantitative determination of alkaloids in in-

* Scientific Section, A. PH. A., Miami meeting, 1931.

[1] Former holder of fellowship of the Rockefeller Foundation in food and drug control, Praha, Czechoslovakia.

dividual organs of the plant in various stages of the period of vegetation, etc. Only a few works pay attention to the qualitative histochemical determinations of alkaloids in the organs of *Solanaceæ* and to the observations of influence of various factors on their qualitative alkaloidal content.

In this study I have endeavored to ascertain not only the quantitative changes of alkaloids taking place in individual organs of the plant or their parts, during their development and during the period of vegetation, but ascertain also the changes which occur in the quality of alkaloids and their mutual relation.

In order to secure sufficient quantity of reliable material to be examined, on which the proposed observations could be performed, I founded for that purpose an experimental culture in quite a large garden in Liben—a suburb of Praha. The fact must be mentioned that the garden is exposed all day to the sun. The seeds of wild growing plants, both annual and biennial, which have been used for sowing, have been gathered from dead herbs in the winter season. The garden soil, where the experimental culture was established, has not been fertilized for a number of years. The material to be examined has been gathered in all cases at about nine o'clock in the morning of sunny days after bright nights and, immediately after gathering, it has been dried in a previously warmed drying vacuum apparatus, heated by means of steam at a temperature of 40° C.

For the quantitative macrochemical determinations of alkaloids the official method of the U. S. P. X has been employed. In some cases, where it was impracticable to secure prescribed quantity of material, it was necessary to assay smaller or quite small quantity.

The qualitative and proximate quantitative histochemical examinations have been carried out according to the method of Klein and Klein-Sonnleitner[1] by the use of microextraction method only, which during the assaying has proved much more satisfactory than the vacuum micro-sublimation method. The proximate quantitative results obtained by this mentioned histochemical method are interpreted in "γ" similarly after Klein-Sonnleitner as follows:

ø	no reaction obtained
+	1 γ of alkaloids or less
++	2 γ of alkaloids or less
+++	5–20 γ of alkaloids or less
++++	50–100 γ of alkaloids or less
+++++	100 γ of alkaloids and more

From the microchemical reagents for the qualitative determination of alkaloids have been employed $N/10$ iodine volumetric solution, picrolonic acid, gold chloride (5%) and strontium iodide plus mercuric chloride solution, reactions of which offer with the mydriatic alkaloids of *Solanaceæ* characteristic precipitates identifying the alkaloids even in their mixtures.

EXPERIMENTAL.

The material, employed for both quantitative and qualitative determinations, has been chosen and gathered in a manner so that I could ascertain not only the influence of various stages of the period of vegetation on the alkaloidal content of

[1] I advise the readers to consult the original papers.

individual organs or their parts but also their content of alkaloids during various stages of development.

I began the experiments with germinating plants during the time when they fully developed both of the cotyledons but have not shown as yet any apparent marks of leave protuberance; their roots were very tender and showed primary tissue with diarch fibrovascular bundles. As a further stage of development young plants have been taken, in which from the leave protuberance minute leaves had already developed. In examining alkaloids in the root of young plants bearing first 2–6 leaves there have been taken into consideration four various successive stages of development, which have been considered after the changes occurring in the tissue: *a* stage, when the parenchyma cells neighboring the inner part of sieves divide by the tangential walls to produce cambium; *b* stage, when cambium formed on the outer side tissue of secondary bark and on the inner side tissue of secondary wood; *c* stage, when the rhizodermal cells of the root are entirely withered and when the parenchymatic exodermal layer of cells obliterated and finally, *d* stage, when the root tissue prevails over the secondary formed tissue and when the meristematic cork layer has been developed.

For the determination of alkaloids in the leaves of young tender plants there have been investigated leaves of the size of cotyledons and leaves of a length of 2 cm. Similarly the epicotyl axil part, two stages of development, have been taken into consideration. These are: the stage when the epicotyl has attained the length of about 2 mm., in which time its anatomical structure consisted still of primary tissue and then the stage when epicotyl has formed a stem of about 2 mm. thick, in which was apparent cambium of several layers, which had given origin to the secondary tissue at certain extent. In the hypocotyl has been examined the alkaloidal content of the germinating plant bearing first two small leaves and of the plant, where the leaves had attained a length of one cm.

In the adult plant the alkaloidal content has been determined first in the root of both the annual and the biennial plant of first and second year of growth and also in the hibernating root. The content of wood and bark has been determined separately in order to find out the comparative proportion of the amount of alkaloids of both parts of this organ. In order to ascertain the influence of various stages of the period of vegetation on the alkaloidal content of root, the roots of both varieties have been gathered in four subsequent months—June, July, August and September—in every case at the beginning of the month with exception of September, when the roots were not gathered until the end of the month. The roots of biennial plants in the second year of growth have been gathered also at the beginning of May. The wintering root of the biennial plant gathered in the same time has also been taken into consideration. To complete these observations the alkaloidal content of the primary root deprived of secondary roots has also been determined.

For the determination of alkaloidal content in the main axis, only the axis of the annual plant has been employed so that cuttings of the same length of about 10 cm. above the ground have been prepared. The thickness of the cuttings selected has always been about the same, that is, at the first gathering in May averaging about 4 mm. and at the second gathering, in September, about 10 mm. In the individual parts of the main axis, that is, in the bark wood and pith, the content

has been examined separately for the purpose of ascertaining its ratio in these individual parts of the axis. Further consideration has been taken of young slender twigs, older thicker twigs, basal portion of the main axis and the entire stem. All material for these determinations has been gathered in two periods, that is, first in June and then in September.

The examinations of the leaves have been performed on both annual and biennial plants; here the petiolate leaves of the rosette only, for which examinations various lengths have been chosen, that is, in both cases 4 cm., 10 cm. and 20 cm. The leaves have been gathered first in June and for the second time in September. Furthermore, the alkaloidal content of the midrib of sessile leaf of the annual plant has been determined in which determination the length of the leaf has been chosen—the same as in the examination of alkaloidal content of entire leaf and likewise has been determined the content of petiole and lamina of the leaves of rosettes of the same length as in other determinations. Furthermore, the alkaloidal content has been examined in the withering leaves which have been turning yellow and in the very yellow, almost dead leaves; for these determinations the leaves have been gathered at the beginning of October.

In the flower the alkaloidal content has been examined in every part and in respect to the fact, that after fertilization of ovules there takes place during the development of the future fruit considerable biogenetic change, which may influence also the quantity and quality of alkaloids, various stages of development of some parts of flower, later of fruit, have been taken into consideration. This concerns especially the seeds wherein, in the first place, white unripe seeds have been taken into consideration, then brownish colored unripe seeds and, finally ripe seeds; furthermore, also the alkaloidal content of ripe seeds which have been stored for several years has been investigated. Also, in the pericarp and in the entire fruit, three stages of development have been selected. The stages of development of other parts of the flower in which the investigation of alkaloids has been made and also the parts of the flower, where no attention has been paid to the special stages of development, are given in detail in the following table of individual investigations.

In order to complete the observations of alkaloidal content of individual organs or their parts and of the influence of various stages of the period of vegetation, the flowering tops have also been taken into consideration. The tops have been gathered in four stages, that is—in June, not yet flowering; in July, with fully developed flowers; in August, bearing young capsules and, in September, bearing only fruits, no flowers.

COMPARATIVE SUMMARY OF RESULTS OBTAINED IN THE INDIVIDUAL DETERMINATIONS.

Organ or Its Part.	Quantity in %.	Quality. Atropine.	Hyoscyamine.	Scopolamine.	Tropine.	Scopoline.
Germinating and Young Plants.						
Germinating plant with fully developed cotyledons	0.018	0	0	++	0	0
Young plants bearing first leaves	0.042	0	0	++	0	0
Rootlet of young plant:						
Stage *a*	0.048	0	0	++	0	0
Stage *b*	0.055	0	0	++	0	0

Stage *c*	0.061		0	0	++	0	0
Stage *d*	0.098		0	+	++	0	0
First pair of leaves of size of cotyledons	0.015		0	0	+	0	0
Leaves of length 2 cm	0.039		0	0	+	0	0
Epicotyl with primary anatomical structure	0.047		0	0	++	0	0
Epicotyl showing transition to secondary anatomical structure	0.038		0	0	+	0	0
Hypocotyl of germinating plant	0.045						
Hypocotyl of young plant bearing first leaves	0.027						
Root.							
Annual plant.							
June	0.103	0.155	0	++	+	0	0
July	0.127		0	+++	++	0	0
August	0.205		0	++++	+++	0	0
September	0.186		0	++++	++	0	0
Wood	0.073		0	++	+	0	0
Bark	0.290		0	+++	++	0	0
Biennial plant.							
(*a*) In the first year:							
June	0.093	0.167	0	++	+	0	0
July	0.147		0	+++	+++	0	0
August	0.196		0	+++	++	0	0
September	0.234		+	++++	+	0	0
Wood	0.062		0	++	0	0	0
Bark	0.305		0	+++	++	0	0
Wintering root in January	0.244		+	+++	++	0	0
(*b*) In the second year:							
May	0.116	0.176	0	++	+	0	0
June	0.144		0	+++	++	0	0
July	0.187		0	+++	++	0	0
August	0.236		0	+++	+++	0	0
September	0.197		+	+++	0	0	0
Wood	0.084		0	+++	0	0	0
Bark	0.312		0	++++	++	0	0
Primary root deprived of the secondary roots	0.082						
Secondary roots	0.111						
Stem.							
Main axis:							
Bark — May	0.032		0	+	0	0	0
Bark — September	0.020		0	+	0	0	0
Wood — May	0.010		0	0	0	0	0
Wood — September	Trace		0	0	0	0	0
Pith — May	0.065		0	+++	+	0	0
Pith — September	0.008		0	0	0	0	0
Basal portion of the main axis:							
June	0.048		0	++	0	0	0
September	0.010		0	0	0	0	0

Young slender twigs:						
June	0.119	0	+++	+	0	0
September	0.062	0	++	0	0	0
Older thicker twigs:						
June	0.069	0	++	0	0	0
September	0.012	0	0	0	0	0
Entire stem of annual plant:						
June	0.045	0	++	0	0	0
September	0.032	0	+	0	0	0
Leaves.						
Sessile leaves of annual plant.						
Length:						
4 cm. June	0.056	0	++	0	0	0
4 cm. September	0.049	0	++	0	0	0
10 cm. June	0.068	0	++	+	0	0
10 cm. September	0.021	0	+	0	0	0
20 cm. June	0.045	0	++	0	0	0
20 cm. September	0.009	0	0	0	0	0
Midrib:						
Length of the lamina:						
4 cm	0.081					
10 cm	0.113					
20 cm	0.102					
Basal leaves of the rosette.						
Length:						
4 cm. June	0.161	0	++	+	0	0
4 cm. September	0.053	0	++	0	0	0
10 cm. June	0.085	0	++	+	0	0
10 cm. September	0.032	0	+	0	0	0
20 cm. June	0.072	0	++	+	0	0
20 cm. September	0.018	0	0	0	0	0
Petiole.						
Length of the lamina:						
4 cm	0.076					
10 cm	0.126					
20 cm	0.115					
Lamina.						
Length:						
4 cm	0.065					
10 cm	0.079					
20 cm	0.042					
Yellowing leaves	0.030	+	+	0	0	+
Strongly yellow leaves	0	0	0	0	+	+
Flower.						
Peduncle	0.103	0	+++	+	0	0
Calyx	0.042	0	+	0	0	0

Corolla — Living	0.037	0	+	0	0	0
Corolla — Withering	Trace	0	0	0	+	0
Filaments of stamens:						
Of unripe anthers	0.030	0	+	0	0	0
Of ripe anthers	0.002	0	0	0	0	0
Anthers — Unripe	0.028	0	+	0	0	0
Anthers — Ripe	0.015	0	+	0	0	0
Pollen grains	0	0	+	0	0	0
Ovary deprived of ovules	0.075	0	++	+	0	0
Ovules	0.095	0	0	+++	0	0
Style with stigma	0.039	0	++	0	0	0
Fruit.						
Peduncle.						
Young fruit	0.051	0	++	0	0	0
Ripe fruit	0.023	0	+	+	0	0
Calyx.						
Young unripe fruit	0.029	0	+	0	0	0
Ripe fruit	Trace	0	0	0	0	0
Dry dead herb	0	0	0	0	0	0
Pericarp.						
Young fruit	0.063	0	+++	0	0	0
Adult fruit	0.045	0	++	0	0	0
Ripe fruit	0.025	0	+	0	0	0
Fruit with calyx and penduncle.						
Young	0.106					
Adult	0.098					
Ripe	0.025					
Tops.						
With no flowers, June	0.053	0	++	0	0	0
Flowering, July	0.074	0	++	+	0	0
Flowering with young fruits, August	0.092	0	++	++	0	0
With fruits, no flowers, September	0.089	0	+++	+	0	0
Seeds.						
Unripe, white	0.125	0	++	++++	0	0
Unripe, brownish	0.106	0	++	+++	0	0
Ripe	0.098	+	++	++	0	0
Stored for several years	0.054	+	+	0	0	+

From this table of results obtained in individual quantitative and qualitative macro- and microchemical examinations can easily be recognized, not only the comparative ratio of the content of alkaloids in the individual organ or its parts but also the variability of content in various stages of the period of vegetation, in regard to the quality and the quantity.

It is interesting that in the first stages of development of germinating plants and young plants bearing first leaves occur of the alkaloids only scopolamine, the amount of which increases during the growth of the plant. The increase of alkaloids is also to be noted in the rootlet, in which in the advanced stage of develop-

ment, when the secondary tissue begins to prevail over the primary tissue, appears also hyoscyamine. With advanced growth of other organs the content of scopolamine decreases, as can be noticed in the leaf, in epicotyl and in hypocotyl; therefore the total increase of alkaloidal content in young plants is due to the increasing alkaloidal content in the rootlet.

In the root of an adult plant a larger amount ot alkaloids is to be found in the bark than in the wood, as in that of annual and in the biennial plant; in almost all cases there is hyoscyamine and scopolamine but hyoscyamine always is in predominating quantity; the third alkaloid, atropine, appears in a few instances.

Study of alkaloids in the bark and wood of the root of *Hyoscyamus niger* has been undertaken already by Molle, who through histochemical method proved their presence only in the bark tissue, and also Siim-Jensen, who found the largest amount of alkaloids in the medullary rays of the bark tissue and then in periderm with exception of the cork layer. Sievers, on the contrary, states regarding *Atropa Belladonna*, that it is not always a rule that the bark of the root is a larger bearer of alkaloids than the wood. In young roots of *Datura Stramonium* Molle found the alkaloids chiefly in the wood, whereas in the bark there was only a very small amount of alkaloids; in older roots he found the alkaloids also in the medullary rays, and he was of the opinion, that through these the alkaloids migrate into the outer layers, that is, in the cortex, where they then prevail. There is no marked difference between the alkaloidal content of the root of annual and biennial plant in the first and in the second year of growth, though the root of the biennial plant in the second year shows slightly higher content. As to the influence of the age of the plant on the alkaloidal content of the root there are given in the literature many quantitative notes concerning chiefly the *Atropa Belladonna*, which, however, have for our study no special comparative significance although we are dealing with a species closely related, because this plant is a perennial one and consequently its biological processes proceed under different conditions. Only that much, perhaps, is to be said that according to the investigations of Gerrard, Lefort, Trögele, Burman and Sievers it is hardly possible to deduct a rule, according to which with the advancement of the age of the plant the fluctuation of the alkaloidal content of the root should conform.

The content of alkaloids in the root increases with the advancing growth of the plant until a definite time, after which it again decreases. In the annual and biennial plant of the second year the alkaloidal content in the root has the highest grade during the time when the plant is in full blossom and when it bears some fully developed capsules. In my investigations the alkaloidal content of the root of the annual plant reached its highest limit earlier than the root of the biennial plant. In the root of the biennial plant in the first year of growth the alkaloidal content rises continually until the time, when the rosette of leaves is dying off; in the hibernating root in the winter time there appears a slight decrease whereas at the beginning of the second period of vegetation it decreases very remarkably. The dead root does not contain any alkaloids.

Literature gives many investigations about the influence of the period of vegetation on the alkaloidal content of the root. From the pharmacognostically important *Solanaceæ* the attention has been hitherto devoted mostly to the *Atropa Belladonna*, less to *Datura Stramonium* and least to *Hyoscyamus niger*.

The alkaloidal content in the root of *Hyoscyamus niger* was investigated first by Thorey and Dragendorff. Dragendorff found that the content of alkaloids of the root, in the time when there appear on the plant the first flowers, is much higher than in the root of fully flowering plant. Squire states that the root of biennial plant is in the early spring, in the time when the plants begin to show first marks of new life, much richer in alkaloids than the root of the same locality gathered in September in the previous year. My finding, therefore, is not in conformance with the statement of Dragendorff nor with the statement of Squire. In connection with the increase of alkaloidal content in the root of the biennial plant the opinion of Buddel is interesting. He presumes the increasing of alkaloids in the plant as being in certain relation to the increase of starch in the tissue, and he explains this opinion by the fact, that in the spring, when the plant does not contain starch, it is poor in alkaloids, whereas in the autumn, when starch is found in larger amounts, it is richer in alkaloids.

In the root of both annual and biennial plants both hyoscyamine and scopolamine are present during most of the period of vegetation, but scopolamine always in smaller amount; with the increasing content of hyoscyamine increases also the content of scopolamine. In the root of biennial plants the occurrence of atropine is striking, which appears, however, only in a minute amount but always at a definite time; that is, at the beginning of autumn and in the hibernating root in winter time.

In the stem the largest amount of alkaloids appears in the pith, but only in the springtime, when the pith is still fully preserved. With the growth of the stem, with which the pith tissue gradually dies off, decreases also the content of alkaloids until autumn when it is limited to very minute amounts. The wood portion of the stem contains less alkaloids than the bark portion. With the progress of the period of vegetation toward autumn the amount of alkaloids in the stem decreases. Sievers found in the stem of *Atropa Belladonna* similar conditions and according to his investigation the difference of the alkaloidal content of thin and thick twigs is still more distinct. The alkaloids in the main axis as in the branches consist almost entirely of hyoscyamine; scopolamine appears only in small amounts solely in young and slender twigs in the springtime, when these show high alkaloidal content.

With growth of the leaf the amount of alkaloids increases to a definite limit and then decreases again, although this decrease and previous increase in adult leaves is not very definite in comparison with the increase of alkaloidal content in the youngest minute leaves. Concerning the ratio of alkaloidal content of individual parts of the leaf, the midrib and the petiole are always richer in alkaloids than the lamina. Alkaloidal content of the leaves of the rosette is, according to my investigations, given herein, higher than the content of leaves of the annual plant. In this respect there are different opinions. Wehmer states that the leaves of biennial plants are poorer in alkaloids than the leaves of annual plants. Kreyer finds in annual plants the same alkaloidal content as in the biennial plants, but does not indicate at what time and under what conditions and circumstances, in both cases, the leaves have been gathered. Some time ago I (Klan) found that the leaves of annual plants show lower alkaloidal content though not more marked than the leaves of biennial plants of first and second years of growth and that the content of last mentioned variety is in the first and second year, with insignificant fluctuations, almost the same. The leaves are always richer in alkaloids in the

springtime than in the fall and the highest alkaloidal content shows in the flowering-time in the summer months, when the greater or smaller fluctuation remains in average about the same height until the end of the period of vegetation when it begins to decrease. Similar results were obtained also by Pater and on the *Atropa Belladonna* by Gerrard, Trögele, Sievers, Bauer and Kreyer. On the other side Thorey and after him Dragendorff state, that according to their investigations, the leaves of *Hyoscyamus niger* contain larger amount of alkaloids before the flowering-time than after it. Dragendorff gathered the leaves at the same locality at the beginning of June and beginning of July and found, that in the first case the alkaloid content amounted to 0.058%, in the second case, however, only to 0.015%. Consequently my investigations are not in accord with these statements. In the dying off yellowing leaves the alkaloids rapidly decrease and finally disappear. Between hyoscyamine and scopolamine we find in the leaves a similar relation as in the root, it means that with the increase of total content of alkaloids increases also the content of scopolamine, but scopolamine remains always in lesser amount. Where there is low content of hyoscyamine, scopolamine does not occur. In the dying yellowing leaves appears also a small quantity of atropine and besides this the basic decomposition products of alkaloids concerned, that is tropine and scopoline, the appearance of which is to be seen in the post-mortem autolytic and fermentative action of the cell content.

From the parts of flower the greatest alkaloidal content, with exception of the peduncle, falls upon the ovules. It is interesting that in these hyoscyamine does not appear together with scopolamine as in other organs but only scopolamine; there is here, therefore, a case similar to the occurrence of alkaloids in germinating plants with primary anatomical structure. On the other hand most of the flower parts—that is, filaments of the stamens, anthers, pollen grains and style with stigma—contain only hyoscyamine and it is only in the walls of the ovary, that there appears besides hyoscyamine also scopolamine, but in smaller quantity. After the fertilization of the ovule during the development of the fruit the alkaloidal content of all parts of the flower, respectively, of the fruit, decreases with exception of ovules which later develop in seeds, whereas in the unripe seeds higher alkaloidal content is found than in the ovules, although the content is insignificant, in comparison with the decrease of alkaloidal content of other parts of the fruit. As it was mentioned, in the ovules there occurs of the alkaloids only scopolamine but after fertilization of ovules during the development of the seed also hyoscyamine begins to appear and in the time of full ripeness of the seeds it equals the quantity of both of these alkaloids. In entirely ripe seeds it is then possible to ascertain also a small amount of atropine. In the seeds which have been stored for a long time scopolamine disappears and in its place appears its basic decomposition product, scopoline.

If we look over the results of quantitative determinations, we find that on the young organs falls relatively a much higher content of alkaloids than on the older, or those which are withering. Consequently the flowering tops which are composed of the developing organs are first carriers of alkaloids. Newcomb and Haynes actually found in the flowering tops of *Hyoscyamus niger* higher alkaloidal content than in leaves; Goddijn reports similar findings in his fenotypes, where in successive order of alkaloidal content he places the flowering tops in the second place. He puts the roots in first place, the stem in third and finally the leaves. Gerrard

on the contrary does not find any marked difference in the alkaloidal content of flowering tops and leaves. From the results of my experiments it can be deducted that the tops, which do not bear the flowers as yet are poorer in alkaloids than the flowering tops, in which the alkaloidal content during the period of vegetation increases very markedly until the autumn, when it begins to decrease. The behavior of the tops is determined by the increase of alkaloids during the period of vegetation as in the case of the leaves which, as can be seen from the table of results, are poorer in alkaloids than the tops. The results obtained by investigations of my own confirm, therefore, the statements of Newcomb and Haynes and of Goddijn; they do not, however, agree with the statements of Gerrard.

COMMENTS.

Comparing the alkaloidal content of adult and young plants, it is necessary to take into consideration the fact, that in the adult organs, in most cases, there prevails the secondary formed tissue, which is free from alkaloids as is the case, especially, in tracheæ, sieves and sclerenchyma cells, which the weight of dried material makes markedly heavier.

The occurrence of atropine in the root of biennial plants should not be seen in the racemization of hyoscyamine due to the autolytic and fermentative action during drying, because all of the experimental material was dried under the same conditions. If it would be supposed that during the time of drying occurred the racemization of hyoscyamine in atropine, then consequently the atropine should have been found also in other experimental material in various quantities, according to the grade of influence of fermentative or autolytic post-mortem action. Relative to its casual occurrence in the root there is the opposition also of the circumstance, that it has been found in decline during the period of vegetation, and in the winter time, that is in the time when the root stores the reserve matters, in connection with which its occurrence could be explained. The occurrence of atropine and of decomposition products—tropine and scopoline—in the withering leaves could be accounted for in the influence of fermentative and autolytic action. The formation of atropine in the ripe seeds was probably due to the biogenetic processes which take place during their development. The occurrence of scopoline in the seeds which have been stored for a long time could, perhaps, be explained by the influence of the decomposition of the fixed oil contained in the seeds.

CONCLUSIONS.

The quantity of alkaloids decreases in the organs during the growth of the germinating plant.

The root of both annual and biennial plant shows the highest alkaloidal content before the decline of the period of vegetation in the last summer months. The secondary roots are richer in alkaloids than the primary root. The bark of the root contains a larger quantity of alkaloids than the wood.

The branches are richer in alkaloids than the main axis and their alkaloidal content is higher at the beginning of the period of vegetation than at its decline.

The alkaloids increase in the leaves with their growth up to a definite period and afterward decrease. At the beginning of the flowering-time the leaf has the

highest alkaloidal content. The lamina is poorer in alkaloids than the midrib and petiole. In the withering leaf the alkaloids are disappearing very rapidly.

The alkaloids disappear in the calyx, corolla, stamens, pericarp and style as soon as these parts of the flower cease to function. Most of the alkaloids are contained in the unripe pericarp. The ovules are very rich in alkaloids. After the fertilization of the ovule the quantity of alkaloids increases in the young seed almost until its full ripeness, when it decreases slightly.

The young unripe fruit is richer in alkaloids than the ripe fruit.

The flowering tops contain a larger quantity of alkaloids than the non-flowering tops.

The dead organs do not contain any alkaloids.

In order of alkaloidal content there follow in succession the root both of annual and biennial plants, flowering tops, fruits, leaves and stem.

In the organs of primary stage of development there occurs only scopolamine and hyoscyamine in the later more advanced stages. This is true especially with the germinating plant and ovules.

In all organs which have passed the primary stage of development there predominates quantitatively without exception, hyoscyamine and scopolamine, the latter always in smaller quantity, if it occurs at all. The increasing content of hyoscyamine also increases the content of scopolamine.

Atropine occurs only in the root of the biennial plant at the end of the period of vegetation and in the wintering root, in the ripe seeds and in the withering leaves where its appearance is post-mortal.

Tropine and scopoline occurring in the withering organs are produced by the decomposition of alkaloids which is due probably to the autolytic and fermentative action.

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STUDIES ON THE DETERMINATION OF CAMPHOR IN CAMPHOR LINIMENT.

II. U. S. P. X Method for Liniments Made with Oils Other Than Cottonseed.*

BY CHARLES F. POE AND GOLDNER LIPSEY.

INTRODUCTION.

In a previous communication (1), in which the literature was reviewed, the U. S. P. method for the determination of camphor in the official camphor liniment was studied. It was found that the method was not sufficiently accurate for the determination of camphor in this preparation. When 20 per cent liniments were assayed, results were found to be as much as 1.34 per cent low. The error was due to the oxidation of the double bond in the olein present in the oil with the probable formation of an enol compound and lower esters and acids.

The official liniment of the U. S. Pharmacopœia is made with a base of cottonseed oil. However, the use of other oils, in this country and abroad, has been practiced in the manufacture of this preparation.

The purpose of the investigation reported in this paper was to determine the applicability of the U. S. P. X method to liniments made with oils other than cottonseed.

MATERIALS AND PROCEDURE.

Different fixed oils, including almond, corn, olive, peanut, rape, sesame and sunflower, were used for the preparation of different camphor liniments. The purification of the camphor and the preparation of the samples were accomplished by the methods described in a previous paper (1). The method of determination was that described in the U. S. Pharmacopœia X, the details of which were described in the communication referred to above.

EXPERIMENTAL.

In Table I is shown the effect of heating in a constant-temperature air oven, one sample of each of the oils. The percentages shown are calculated from the gain in weight of the oil due to the oxidation during heating. This gain, of course, would account for most of the error found when camphor was determined by this

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method. If, for instance, an oil gave an increase in weight due to oxidation of 1.25 per cent, this would be equivalent to an error of this amount when the determination was made on a sample of the liniment.

TABLE I.—GAIN IN WEIGHT OF OILS WHEN HEATED ALONE.

Kind of oil.	Dish used.	Percentage Gain, Time of Heating. 2 hours.	3 hours.	5 hours.
Almond	Quartz	0.05	0.07	0.10
	Porcelain	0.01	0.09	0.20
	Aluminum	0.11	0.25	0.46
Corn	Quartz	0.15	0.22	0.41
	Porcelain	0.15	0.27	0.41
	Aluminum	0.14	0.29	0.61
Olive	Quartz	0.00	0.04	0.20
	Porcelain	0.02	0.13	0.22
	Aluminum	0.00	0.03	0.29
Peanut	Quartz	0.00	0.06	0.24
	Porcelain	0.00	0.07	0.26
	Aluminum	0.01	0.11	0.33
Rape	Quartz	−0.04	−0.02	0.06
	Porcelain	−0.02	0.00	0.08
	Aluminum	−0.06	−0.01	0.13
Sesame	Quartz	−0.04	0.00	0.11
	Porcelain	−0.05	0.00	0.06
	Aluminum	0.11	0.25	0.29
Sunflower	Quartz	0.00	0.11	0.35
	Porcelain	0.02	0.15	0.37
	Aluminum	0.12	0.39	0.83

Table I reveals that all of the oils, except almond, olive, rape and sesame, showed a rather large percentage gain when heated in the quartz and porcelain dishes. As had been previously found in the case of cottonseed oil, the gain in weight of all the oils was greater in the aluminum dishes.

Determinations were next made for camphor on the liniments made from the oils given in Table I. From four to eight samples were made from each oil using different lots of camphor. In Table II are given a few of the results obtained when the determination was made on some of these samples.

TABLE II.—DETERMINATION OF CAMPHOR IN LINIMENTS MADE FROM VARIOUS OILS.

Kind of oil.	Dish used.	Per cent camphor original.	Percentage Found, Time of Heating. 2 hours.	3 hours.	5 hours.
Almond	Quartz	20.00	18.31	19.51	19.51
	Porcelain		18.70	19.62	19.66
	Aluminum		18.42	19.14	19.29
Corn	Quartz	20.00	18.00	19.37	19.36
	Porcelain		18.31	19.38	19.36
	Aluminum		18.42	19.33	18.97
Olive	Quartz	20.00	19.29	19.70	19.68
	Porcelain		19.27	19.78	19.74
	Aluminum		18.95	19.53	19.43
Peanut	Quartz	20.00	18.76	19.41	19.35
	Porcelain		18.95	19.46	19.36
	Aluminum		18.73	19.26	19.07
Rape	Quartz	20.00	18.85	19.66	19.60

	Porcelain		19.03	19.69	19.60
	Aluminum		19.03	19.43	19.36
Sesame	Quartz	20.00	18.49	19.52	19.44
	Porcelain		19.52	19.51	19.41
	Aluminum		19.00	19.27	19.10
Sunflower	Quartz	20.00	18.29	19.80	19.60
	Porcelain		18.12	19.62	19.42
	Aluminum		18.48	19.63	19.52

All of the results given in Table II are low at the end of five hours of heating. The greatest error occurred with the liniments made with oils of corn, peanut and sesame. As with the liniment made from cottonseed oil, it appears that the U. S. P. X method for the determination of camphor is not satisfactory. When the liniments are made with fixed oils other than cottonseed oil, the errors in the determination of camphor are not so great, however.

A number of additional samples of the various oils were used for the preparation of liniments. These samples were assayed for camphor by the official method, except tin dishes were used in lieu of porcelain dishes. Experiments had shown that tin dishes were very satisfactory for the determination. These results, together with those obtained when the oils were heated alone, are given in Table III. The results given in this table confirm those already given in Tables I and II. All of the oils showed oxidation, but not to so great an extent as did cottonseed oil. In the determination of camphor, the results are not so low as with the liniments made with the cottonseed oil.

TABLE III.—EFFECT OF HEAT ON OILS AND THE DETERMINATION OF CAMPHOR IN LINIMENTS MADE FROM THESE OILS.

Kind of oil.	Oils Heated Alone, Gain in Per Cent. 2 hours.	4 hours.	6 hours.	Camphor Liniments (original 20 per cent) Camphor Found, Per Cent. 2 hours.	4 hours.	6 hours.
Almond 1	0.00	0.04	0.05	16.94	19.80	19.80
Almond 2	0.09	0.22	0.38	17.22	19.74	19.67
Corn 1	0.08	0.19	0.46	18.56	19.68	19.62
Corn 2	0.07	0.16	0.40	17.86	19.62	19.42
Olive 1	0.10	0.22	0.30	18.24	19.64	19.62
Olive 2	0.00	0.09	0.26	17.32	19.76	19.72
Peanut 1	0.10	0.26	0.40	16.14	19.74	19.72
Peanut 2	0.16	0.40	0.64	19.38	19.68	19.50
Rape 1	0.04	0.17	0.42	18.90	19.76	19.66
Rape 2	0.06	0.22	0.41	18.56	19.73	19.60
Sesame 1	0.07	0.30	0.56	16.82	19.62	19.49
Sesame 2	0.18	0.43	0.60	16.88	19.52	19.48
Sunflower 1	0.11	0.40	0.56	19.40	19.66	19.40

CONCLUSIONS.

1. The U. S. P. X method for the assay of camphor is not satisfactory when applied to liniments made with any of the common fixed oils.

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UNIVERSITY OF COLORADO, BOULDER, COLORADO.

"A Study of Emodin-Bearing Group of Cathartics"—see pages 1210 to 1218.

PHARMACY AS A CAREER.

THE Office of Education, United States Department of the Interior, has just issued *Leaflet No. 14* on Pharmacy as a Career, of fifteen pages, "designed for the use of high school and college students, orientation classes, guidance committees, counselors, teachers and parents" and as one of a "series of college counseling and advising for the professions; what the occupations are; what preliminary training is offered; length of training; student budget; and selected references." The other public health professions represented in the series are medicine, dentistry and nursing. The leaflets are written by Walter J. Greenleaf, specialist on Higher Education and copies may be obtained from the Superintendent of Documents, Washington, D. C.

The leaflet is written in somewhat popular style and by one who knows from experience what the student and student adviser wishes to learn about a prospective career. It is not as complete as it should be and the several surveys now being conducted should develop the data required to round out the picture for pharmacy.

The inclusion of a leaflet on Pharmacy in this Career Series by the Office of Education is a further recognition by the Government, and the following quotation from it is both encouraging and significant "As the educational requirements for entering the profession of pharmacy have increased there has been a corresponding recognition on the part of the Government of the professional qualifications of pharmacists."

Although written primarily for students who are considering pharmacy as a career, the leaflet will be interesting to pharmacists as giving an estimate of the profession by a layman trained to evaluate occupations. It will soon be re-written to correspond to the four-year course when the ASSOCIATION will coöperate with the Office of Education in a wide distribution of it to public and private high schools, city and country superintendents of education, high school, college and public libraries, and others interested in learning what pharmacy has to offer as a professional career. The publication fills a long-felt need and the profession is indebted to the Office of Education for supplying it.—E. F. K.

THE TRIPLE ALLIANCE IN MILITARY MEDICINE.*

The domain of Military Medicine is a blend of three major components or subjects: Medicine, Dentistry and Pharmacy, with sanitation and hygiene essential factors of each; veterinary surgery is a branch. As to which one of these three departments of human welfare effort shall be esteemed paramount, there may be justifiable variants of opinion. There can be no question but each is on a practical par with the others in the objects they aim to achieve.

My interests in therapeutics are in other measures than drugs, yet for years I have been impressed by the splendid research work that the AMERICAN PHARMACEUTICAL ASSOCIATION has been doing for our benefit, quietly, unobtrusively, honestly and practically unknown to the medical profession. This is set forth candidly in the annual report on the PROGRESS OF PHARMACY and in its exceedingly able JOURNAL; also the research work of the splendid *American Journal of Pharmacy* for nearly a century past; these publications embrace thousands of pages of scientific matter better known and appreciated in foreign countries, I believe, than it is in our own.

* From a paper read before a Joint Meeting (1917) of the Philadelphia Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION and the National Pharmaceutical Service Association, by the late J. Madison Taylor, A.B., M.D., and published in the *New York Medical Record* and in the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.—These paragraphs from a paper by a leading member of the medical profession are reprinted as a tribute to the deceased, who never faltered in giving pharmacy due credit for its service.—*Editor.*

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DEPARTMENT OF BUSINESS MANAGEMENT

Conducted by Paul C. Olsen.*

COMMENTS, QUESTIONS AND SUGGESTIONS ARE INVITED AND WELCOME.

Readers are invited to submit comments, criticisms and suggestions regarding the material which appears in this department. The Editor will also undertake to answer questions regarding general problems of business management. Letters of general interest will be published, but the writer's name will not be revealed without his permission.

ADVERTISING AND SELLING PROBLEMS IN DRUG STORES.

Store Layout and Arrangement—Continued.

Drug store layout and arrangement is definitely and inseparably connected with drug store profits. Just why this is so was the subject of the preceding article in this series. The purpose of this and a following article is to point out the simple and easily understood principles, which must be considered in drug store layout and arrangement if maximum profits are to be obtained from the operation of the store.

These principles are of the greatest importance to all types of drug stores. Their application sometimes varies from store to store but the principle is the same. They apply to drug stores located in the busiest shopping sections of the large cities. They apply to drug stores in the smallest and most remote trading centers. They apply to professional drug stores. They apply to drug stores in which the fountain and luncheonette service is the greatest single revenue producer. They apply to neighborhood drug stores in the poorest sections of large cities and to drug stores in the most exclusive residential suburbs.

They apply to drug stores with a floor area of less than a thousand square feet and to drug stores with floor areas of fifteen thousand to twenty thousand square feet.

They apply to drug stores in corner locations and to those with inside locations. They apply to square stores, triangular stores and to stores which are long and narrow. They apply to drug stores not only of all types and sizes but to drug stores in all sections of the United States and Canada.

What are these principles which have these widespread though varying applications? They seem so obvious when stated in the abstract that one wonders that they ever are disregarded. The reason that they are disregarded is not because of a failure to recognize the existence of the principle but because of difficulties and handicaps in applying the principle in a particular situation.

For instance, it is generally recognized that goods in the widest demand should be most accessible. That is to say the stock from which such sales are made should be the most easily and quickly reached, thus saving sales people's time and their consequent salary costs and increasing the speed with which customers are served.

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In most drug stores the great bulk of the sales made are of prescriptions, chemicals and drugs, proprietary medicines and toilet articles with, in addition, small but frequently profitable soda fountain, cigar and candy departments.

If the majority of the customers who enter a drug store go to the drug counter, why is this most important counter almost invariably located in the rear of the store? Of course, it is an advantage to the proprietor and his assistants, who customarily are to be found in the adjoining prescription room when they are not waiting on customers.

The placing of the drug counter in the rear of the store has more to recommend it than mere convenience to the store's selling staff. Consider the frame of mind of people who enter a drug store. Almost invariably, they have a definite purchase in mind before they ever enter the store. Women and men don't come into a drug store just to look around the way they do in department stores and in variety stores. They come to the drug store only when they are ready to buy something upon which they have definitely decided.

The extra few seconds required to reach the counter at which they can make their purchases are, therefore, not enough of a handicap to keep a person from making the purchase. Of course if people, in order to reach the drug counter, have to thread their way through a labyrinth of soda tables, filled with loud talking, sprawling women in order to reach the drug counter, they are likely to go elsewhere the next time they want to make pharmaceutical purchases.

The fact that people do have a definite purchase in mind when they come to a drug counter in the rear of the store is fortunate, because they involuntarily must pass through other parts of the store and see there the merchandise it has to sell. It is to be hoped always that the store and its merchandise on display will create favorable impressions and, in a satisfactory number of cases, a willingness to buy this merchandise.

Considering still this same general principle that goods in widest demand in a drug store should be the most accessible, it will be seen that the arrangement of merchandise in the cases, shelves and drawers at and near the drug counter should be such as to put the merchandise most frequently sold closest at hand. It is amazing how often this seemingly obvious principle is disregarded to the disadvantage of the store and its customers.

From the standpoint of sales, tooth paste is the most important single line of toilet goods for sale in drug stores in all but the poorest neighborhoods. It follows, therefore, that a large proportion of the customers who come to the drug counter of a drug store come there to buy tooth paste. Yet I saw one drug store in Indianapolis with annual sales over $60,000 in which every time a customer asked at the drug counter for tooth paste, it was necessary for the sales person to come out from behind the drug counter, walk twenty steps to a wall case near the front of the store, open the case to get the merchandise and then walk twenty steps back to the drug counter again to wrap it.

Most merchants recognize that merchandise which already sells most easily and in largest volume is the type of merchandise on which it is easiest to create additional sales by displays—particularly displays which will be seen by people as they stand at the drug counter. Therefore, they are not content merely to have

the selling stock of this merchandise easily accessible at the drug counter but they put it out on display so that even more sales of it can be made.

Frequently, however, merchandise of this kind is chosen by some druggists for vigorous price slashing and even sale at prices below its cost. If a druggist does not care to engage in this price competition, any more than he has to, he feels that to attempt to push the sale of such merchandise at what he considers a fair price would adversely affect his reputation for fair prices on other items of merchandise on which price competition is not keen.

This situation does not alter the fact that such merchandise should be accessible quickly at the drug counter, for a large number of sales are certain to be made in it. This accessibility can be achieved, as any druggist will recognize, without displaying the merchandise if he does not care to do so.

The principle of accessibility in the location of the cigar department in a drug store is equally important. Cigar departments are frequently to be found in drug stores just inside the entrance. One familiar arrangement is for the cigar department to be on one side and the fountain on the other and as close to the entrance as possible. If the cigar department occupies small space, it often happens that the cigar department adjoins the fountain, the cigar cases occupying the position closest to the entrance.

The theory back of these arrangements is that purchases in the cigar department are casual and made on impulse and won't be made at all if obstacles, such as the necessity of walking long distances inside the store, are interposed. This is true if an important number of customers enter a drug store only for the purpose of making purchases in the cigar department. The conditions under which this is most likely to be true are to be found in drug stores in the centers of the larger cities. It is not so true of neighborhood locations and locations in the smaller communities. A little observarion will prove the truth of this statement.

Recognizing this fact, druggists in other than city center stores have seen that they could speed customers' service and save their own steps and time if the cigar department were located on a side of the store and nearer the rear so that it would be only a few steps from the drug counter.

Rapping on the glass of the cigar case with a nickel is an ancient drug store custom to attract the attention of the sales person in the rear of the store. It illustrates how many extra steps must be taken to serve the cigar counter in drug stores in which the volume of sales in this department is not large enough to justify one sales person spending all his time there. Under such situations, it probably is true that cigar customers could be served more quickly, with a cigar counter nearer the drug counter, even though they have to take extra steps inside the store to reach it. At the same time, the store would have the advantage of these customers coming far enough inside to see most of the merchandise it has on display.

Under other circumstances, the combination of service at the fountain and at the cigar department may be practicable if they are placed side by side. Such conditions exist when one or more persons must be employed constantly at the fountain yet there is not enough cigar business to justify the employment of an additional person there. The combination naturally should not be attempted if it slows up service either to fountain or to cigar customers.

As I suggested earlier in this article accessibility is not the only governing principle in the layout of a drug store to permit the production of maximum profits. Other principles of similar importance will be the subject of the next article in this series.

WHY WE TEACH PRINCIPLES OF WINDOW DISPLAY.*

BY L. C. ZOPF.[1]

Why we teach Principles of Window Display in the College of Pharmacy, State University of Iowa is a question asked us many times. I am sure that all colleges of pharmacy have had similar questions asked of them. The familiar question of why do the colleges not teach more subjects which will be of direct application to the general routine of the store can be answered in two ways; *first*, in the two-year course there was absolutely no time available for the teaching of such courses and *secondly*, the duty of the colleges of pharmacy is to educate students to be competent pharmacists.

In the three-year course we have only been able to find one hour for an additional commercial course. After a thorough study and discussion by our faculty it was decided that the course of greatest value, from the standpoint of actual use, would be principles of window display.

Possibly the paramount reason for the introduction of such a course was the demand made upon us by the students enrolled in our College. It was not a very uncommon thing, and is not at the present time, to receive letters from prospective students asking us for a bulletin listing the courses given by our College and particularly asking if we are in position to give a course in window display work. This one reason, above all others answers the "why" of this question.

If men, who are entering this profession, can see far enough ahead to demand such a course, it is apparent that the men who have been in the field for several years should be able to predict just how much value these men would receive from such a course.

With this thought in mind our faculty made an analysis of the graduates of our College. This survey revealed the fact that 72% of our graduates enter and remain in the retail division of pharmacy. This means that these men will have use for such a course from the first day they receive a position in a retail pharmacy.

The remaining 28% of our graduates are employed in manufacturing or research laboratories, in hospitals, in teaching, as salesmen; some enter medicine and other professions. Of these 28% many are in position to use such a course, for at times it is necessary for them to seek employment in a retail pharmacy while waiting for an opening in their desired division.

A thorough study of the requests made of a graduate pharmacist when first entering the retail store, revealed the fact that the employer wanted not only a competent pharmacist, but preferred a man who also had a thorough business knowledge.

It is not uncommon for the owner of the store to ask the pharmacist during the first week he is employed to change the display in the window. If he is not in

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* Section on Commercial Interests, A. PH. A., Miami meeting, 1931.

[1] College of Pharmacy, University of Iowa.

position to do this it is necessary for the employer to require this service of one of his other employees or do the work himself. In most cases the inability to make a display disappoints the employer. It is true, the young man can say that he was employed as a pharmacist not a window trimmer, but nevertheless in this particular period and especially during this time of depression the average drug store is endeavoring to conserve expenditures in every way possible.

During the latter part of the nineteenth century when every drug store was doing a satisfactory amount of prescription work, the art of window decorating was just in its embryo stage. The pharmacist at that time used his windows to display some of his highly colored liquid preparations and his odoriferous and curious drugs.

As the modern windows developed, the pharmacist was forced to bring his displays up to the standards of the time. If you will study a city with a population of 10,000, you will notice that the dry goods merchant, the clothing merchant and, in some instances, the shoe dealer has a display man whose duty it is to devote his entire time to displaying the stock in such a manner that they attract the attention of the passerby and stimulate the desire to purchase.

It is to be regretted that one line of products which rightfully belongs in the drug store is to-day being sold by many of the dry goods and general merchandise stores; namely, cosmetics. In this product the druggist is up against a real problem when it comes to the display of the articles. The dry goods merchant, employing a man who is trained in the principles of display, attracts attention of prospective customers to his window. The pharmacist on the corner may be a man who has had scientific training with a scientific knowledge of cosmetics and is in position to give advice as to their uses, but his sales fall off because he does not have the ability to display merchandise in a manner which attracts the passing public.

Another reason why I feel that such a course should be taught in a college of pharmacy is that the pharmacist, if he is to maintain his standing on a par with other business men of his city, must be able to show his merchandise in an attractive manner and add prestige to his store.

Approximately 50% of the students who come to us have had some training in store work, not always in a drug store. If they have had such training before coming to school, they will endeavor to use that experience in their merchandise displays, when they get back into business.

There are no definite rules applicable to pharmacy displays which are not applicable to other lines, but there is a background in drug store displays which does not obtain in other types of business. For example, the window display material which the National Wholesale Durggist Association is supplying has a background and a far-reaching effect which other lines of business cannot make use of.

Recently, I inquired of a wholesale druggist of our state how the retail pharmacies were reacting toward the maps and other material so generously furnished by the Association. I was very much surprised when he stated that when they first came out his company had aimed to send a map to every retail pharmacy, but now they bought only about a hundred and all of these were not required. This goes to prove that if these men, who are in retail pharmacy, had the training and proper attitude toward their profession they would accept of the opportunity and use this material. If the larger companies deem it a valuable asset to the extent that

they feel justified in employing a specialist in this work, surely the pharmacist should know the basic principles of window display.

A specialty company offered to pay a druggist in a city of about 50,000, a sum equal to his rent for the use of one of his windows and a front display case in his store. Were the windows of this drug store valuable? Yes, but the druggist had no conception of their value until this offer was made to him.

You might well ask the question, will these men, who are taking this course, do any more in the way of window display than the men who have not had it? That question I cannot answer at this time, since we have only taught the course for two years. Some of our students have entered pictures of their windows in several national contests and others have submitted pictures of their National Pharmacy Week displays to the pharmaceutical journals.

We must admit that in the average retail pharmacy of to-day it is necessary for the pharmacist to be a merchandiser as well as a professional man, and window displays are one of the best and most reliable means for increasing his sales. If graduates in pharmacy have an inferiority complex toward their competitor in the field of merchandising they will realize that they lack something in their training, which the competitor has obtained.

You might ask, what value will a man receive from this course who is going to engage in professional pharmacy? I can cite only one example—a graduate of our College was in my office recently and commented on the display which we had installed in our model window; he is the owner of a successful prescription pharmacy and remarked that he would like to know a little about the arrangement of merchandise and the proper method of display. In reply to my query as to the value that would be to him, he said, "We have a display case in our waiting room in which we keep a display of rubber goods and other sick-room supplies and it is impossible for me to arrange that case in a manner which is attractive so that it will sell merchandise. Furthermore from time to time I try to display some of the products which we manufacture in our laboratory and I am at a loss to display these in an attractive manner."

There is a possibility that some might raise an objection to making this a required course. Although many of our students intend to enter a laboratory, they may be called upon to do service in a retail pharmacy or, perhaps, some day do this type of work in their own store. The average college student on entering pharmacy as a freshman does not know definitely which division of the work his inclinations will follow. The benefits of this course would be of no hindrance to a laboratory man, and the chances are that he may have some use for such work in the display of some of the laboratory products.

The duty of a college of pharmacy is to train men and women in the science and art of preparing, compounding and dispensing medicine. All colleges have endeavored to fulfil this duty, but the demands on the pharmacist have increased and he must now be a business man as well as a professional man, and the courses of the colleges of pharmacy should be arranged accordingly.

RED CROSS IN 50TH YEAR OF SERVICE.

Observance of the Golden Anniversary of the American Red Cross this year marks that society's fiftieth year of service to humanity. Do your bit by joining.

MERCHANDISING U. S. P. PRODUCTS.*

BY J. J. NICHOLS.

Before the physician can intelligently prescribe for a patient, it is necessary to make a diagnosis. To do this, he must examine the patient and learn something of the history of the case. In other words, the "whys" and the "wherefores" are essential.

In a similar sense, when we speak of merchandising pharmaceutical products, we must diagnose the situation; we must know the "whys" of conditions that have made necessary a discussion of this subject.

The retail drug store has shared conspicuously in the changes which have characterized the entire field of distribution in the United States in recent years. Particularly is this true in respect to the modern tendency to break down former rigid divisions among the various channels of distribution. The result is, that it is no longer to be held axiomatic for the shoemaker to stick to his last; the grocer to his groceries or the cigar store to its smokers' articles.

While the cigar stores have added to their line such things as candy, toiletries and cameras, the average American drug store has become a general merchandise mart, stocked with an amazing variety of articles formerly sold through other retail channels. As a consequence, the drug business has become increasingly competitive. The transformation began, I believe, with the advent of the soda fountain. At about the same time, in many places, cigars were being added to druggists' stocks, to aid smokers who could not purchase them at cigar stores on Sundays, because of the "Blue" laws. Soon the mortar and pestle, emblem of pharmacy, was removed from over the door, and a cigar sign with the word "drugs" on the lower border, was substituted. Soft drink, laxative, candy, hair net and razor blade manufacturers, in rapid succession, obtained the use of the druggist's windows for advertising purposes. The colored show bottles disappeared and the characteristic appearance of the drug store was changed.

Ready-made medicines soon took the place of those usually prepared in the drug store. The druggist gladly gave up his task of preparing syrup of white pine, insecticides, hand lotions and similar preparations, leaving this to manufacturers. Instead, he looked after the interests of the Post Office sub-station, and the sale of theatre tickets. I contend that, during the past thirty years druggists have given more thought to furthering other people's business than they have to pharmacy. They have entirely forgotten to keep in touch with the physician, and have allowed him to get into a rut nearly as deep as their own. While the doctor gives out patent or proprietary preparations in his office, the druggist sells them under definite trade names. The public is always the innocent victim.

Another field which has been neglected is that of cosmetics. Department stores enjoy most of the volume in this field; and well they should, as the heads of these stores, as well as most of the personnel, know far more than the average druggist does, concerning this line of drug store merchandise. This is a field which is most lucrative, and which, simultaneously, produces volume.

There is another aspect to conditions as we have them, and that is the number and type of pharmacy schools in the United States. Until we reduce the number

* Section on Commercial Interests, A. PH. A., Miami meeting, 1931.

of schools and improve teaching facilities, pharmacy will lag behind other professions. Until standards are raised and the number of graduates is limited, as in the medical profession, the promise of our schools of pharmacy will not be fulfilled.

Having diagnosed the ills of our profession, we now come to the remedy. We must give more attention to pharmacy, and less to sidelines. We must change the appearance of our stores so that they will command the respect of the passerby. To accomplish this, we must use displays in our windows and in the interior of our stores, that will restore the drug store appearance. This can easily be done, as there are numerous drug store products that will prove of interest. You can display such things as items for first aid, for the sick-room, for the baby and for other household needs. In most cases, you may be making such displays; but are you selecting merchandise that you control, or are you featuring advertised brands, the ghost of which will come back to you later in the form of the "cut price" bugaboo or the "sold in grocery or department stores" curse?

Interior displays can be made, featuring tincture of green soap as a harmless shampoo, and tincture of vanilla as a pure and unadulterated flavoring. Iodine, rose water and glycerin, cold cream, dental powder, Dobell's Solution and cascara, are a few of the hundreds of preparations that you can display, improving your standing in the community by so doing.

There are several important considerations in the successful merchandising of these preparations. In the first place, prepare them in your own store, giving every care to the fineness of ingredients. Secondly, be careful of the packaging: select attractive bottles and boxes; have your label manufacturer prepare a neat label that w.ll be individual in your community; use the finest corks obtainable or the new bakelite caps which are now being featured. Screw tin caps were never intended for pharmaceutical purposes. Leave them to the grocer or varnish maker. Thirdly, set a price that is fair and not exorbitant, on such preparations.

Make calls on your physicians. Detail them on U. S. P. and N. F. preparations. Impress them with your honesty, without mentioning the word *honest.* Offset the detestable remarks of the physicians' supply house salesman. Invite the doctors to your store. Call their attention to the absence of patent medicine displays. Impress them further with your knowledge of biological products, and educate them to prescribe, without their knowing that you are teaching them. This pays big dividends. The department store cannot get such business from you.

Make a display of such chemical apparatus as test tubes, and pipettes; apparatus that will bring the youth of your neighborhood to your store. Help the young men and women with simple chemical problems and you will have them for customers, and, most important of all, as enthusiastic boosters.

The pharmacist must learn that his mission in life is to be the hygienist of his community. Until he has done this, pharmacy will fall short of the accomplishment of its object. Pathological chemistry is taught in most of our pharmacy schools, yet how many pharmacists use the knowledge acquired, after leaving college? Recently, a physician in New York, speaking before the New York City branch of this association, stated that druggists were not prepared for this work. On the whole, this is true; but there certainly are a number of druggists qualified. The fact is, they have not taken the trouble to so advise the physicians. Brush

up on this subject; equip your store with the proper apparatus; and then let your physician and lay customers know that you are prepared to make urine analyses and blood tests. Don't continue to let this profitable part of your training go to technicians and office attendants who have, at the most, only a superficial knowledge of the subject. Supply your physician with reagents and stains for his microscopic use.

Dentists are now beginning to write prescriptions. They need your help. Call on them, and leave samples of liquor antisepticus and the alkaline solution. Train them to buy their pharmaceutical and chemical necessities at your store.

Veterinarians are likewise potential customers. See that the representatives of the better pharmaceutical and biological houses call on the veterinarians, and, you, too, show them samples of boluses and other preparations that you can supply. Thus, you can keep for yourself the business that is going to "fly by night" pharmaceutical houses, many of which have no pharmacists employed.

Hospitals are good prospects in rural and suburban localities. Get some of their business by getting acquainted with their superintendents.

In closing, may I add that the suggestions which have been made have all been tried with great success, and I have every reason to believe that, if we will be more concerned with the sale of legitimate drug store merchandise, we will have little need to worry about cut prices, chains and other bugaboos.

In the above window a picture of Dr. Lyman Spalding (Father U. S. Pharmacopœia) is shown; below this the oil painting of Dr. James A. Spalding, referred to in the October JOURNAL, page 1135; see also November JOURNAL for 1928, page 1144. We are indebted to Mr. Hay and Dr. Spalding for preparing this window.

A COURSE IN PHARMACAL SUNDRIES AND SICK ROOM SUPPLIES.*

BY C. W. BALLARD, PHAR.D., PH.D.

In the efforts to keep pharmaceutical education abreast of the times, the length of the pharmacy course has increased from two years to three and is fast approaching a further increase to four years. Each of these educational advances, while permitting much needed extensions of courses already established, has also resulted in the introduction of new material. As the choice of this new material has been the cause of considerable controversy, I believe it advisable, before advocating the acceptance of a course not heretofore included in the standard curriculum, to review the following basic considerations.

Modern pharmacy is a business or profession demanding a broader training than many other pursuits. It, like other vocations, has become specialized within itself and the inclusion of these specializations with the original adds greatly to its scope. We have perhaps reached a point, already passed in many professions, where our instruction should recognize the condition by dividing itself clearly and distinctly into a general course for all students, followed by specialized instruction for those desiring to enter the allied fields. Such a plan would materially aid the cause of pharmaceutical education as there are certain of the allied fields in which a general pharmaceutical education is desirable as a ground-work and for which specialized instruction is not given in any other school of a university system. If we persist in attempts to use but one curriculum to acceptably prepare men for retail pharmacy, pharmaceutical manufacturing, public health fields, clinical and bacteriological work, analytical and industrial chemistry and all other branches more or less closely allied to pharmacy, it is likely that our efforts will not be successful. Therefore the real issue is, shall the basic pharmacy curriculum be so broad as to attempt to prepare men for both retail pharmacy and its allied but specialized branches, or shall it be limited primarily to preparation for the practice of retail pharmacy? I hold that the latter view is the more satisfactory in that it provides a definite objective and also because a majority of pharmacy graduates enter this field. But at the same time, the pharmacy schools should be fully prepared to meet the needs of those who, after completing the basic course, desire to specialize in the allied branches. If pharmaceutical education is to be primarily for the practice of pharmacy, the subject here termed Pharmacal Sundries might well be added to those courses proven necessary to the practicing pharmacist.

REASONS FOR THE COURSE.

For several years before the establishment of this course at the New York College, we had been hearing comments from those employing our graduates as to the general lack of knowledge in reference to many common articles of stock. Perhaps the condition was due to the abandonment of the old apprenticeship system under which many of the employers entered pharmacy. Usually a part of the apprenticeship was served before entering a pharmacy school, whereas to-day it is no uncommon thing for the pharmacy student to begin with his schooling and then enter a retail pharmacy. Under the older system a man gained a certain amount of knowledge in reference to these sundries by mere contact. Taking the condition

* Section on Legislation and Education, A. PH. A., Miami meeting, 1931.

as a possible fact and dismissing the causes, remedies were sought. For a year or two Prof. W. J. Bonisteel, then on our staff, conducted an extension course dealing with the subject, but as this was optional work it did not remedy the situation generally. At a later date and during the transition to a three-year course, the classes were circularized requesting answers to questions suggested by those commenting upon the shortcoming. The questions dealt with the differences between male and female urinals, colon and rectal tubes, 10- and 20-gage catheters, catgut and chromic gut, and gauze and flannel bandages. The answers were amazing and fully proved the contentions of retail pharmacy. About this time the "Charters Report" was issued and scanned to ascertain if any reference to these articles appeared. The general situation was touched upon at two points. Under Branch IV, Commercial Pharmacy, Merchandise Information, pages 250–254, excellent outlines are given for the treatment of soaps and hot-water bottles. Also under this same branch but in the Inventories, Table XXIX, pages 330–344, it is shown that most of the pharmacies inventoried, stocked the articles in question. In addition to the criticisms of the retail pharmacists and the recognition accorded by the "Charters Report," it is noteworthy that in modern business of almost any sort, salespeople are given intensive courses dealing not only with the actual sale of merchandise but also its qualities, peculiarities and manufacture. Large concerns find the procedure pays and how much more to the point is it that a retail pharmacist, with his intimate contact and personal business to consider, should know something more than the margin of profit and sales price of a clinical thermometer. Such information is not purely commercial and herein I differ from the "Charters Report" in the matter of placement. It is professional knowledge of a sort which adds to the possibilities of the pharmacist being considered more than a merchant.

Having decided upon the advisability of this course, the question of a title, which would be sufficiently descriptive and elastic, presented itself. In reviewing the list of desirable topics, it was at once apparent that a very heterogeneous collection of items must be dealt with. In an effort to avoid the extremes of general merchandise, the title "Pharmacal Sundries and Sick Room Supplies" was finally hit upon, but as this was cumbersome it was subsequently shortened to "Pharmacal Sundries." There were opinions that the course should include trusses and supporters and even surgical instruments, but our decision was against these on the ground that they represent specialities, despite the fact that trusses may be carried in retail stores. We also were of the opinion that the fitting of trusses, which often accompanies their inclusion in the drug store stock, is a matter for the dealer in surgical supplies and the physician.

RELATIONS TO COMMERCIAL AND PROFESSIONAL PHARMACY.

As previously stated, the "Charters Report" places this work among the commercial subjects and it certainly presents some commercial aspects, as knowledge of this class of merchandise is of influence in its sale. For pharmacists in metropolitan centers it is of further commercial interest in that many of the articles are not stocked by department stores and the so-called drugless drug stores. The pharmacist faces less competition in their sale and in fact often has no competition because of immediate need for a particular item. A customer is not likely to

shop around for a Sprague ice bag when it is ordered by a physician. Again, from information supplied me by retail pharmacists, the percentage of profit is very satisfactory. These facts show that the course has contacts with commercial pharmacy.

The reasons for my dissent from the "Charters Report" placement are more clearly apparent when one examines the list of topics presented herewith in syllabus form. Some of the articles are sold largely to physicians and sales arguments do not enter into the transaction. The part of the pharmacist consists in an ability to intelligently discuss the article with the physician and by being able to do so he certainly rises in the physician's estimation. Some of the articles possess distinct medicinal actions, a greater number are widely used as adjuncts to medical treatment and it is these actions and uses which are of immediate concern to the customer. The pharmacist may be under the necessity of instructing a purchaser regarding the use of an article ordered by the physician, as the latter may merely order an ice bag or a mustard plaster applied, without comment as to the procedure. I have even heard of instances in which the physician stated that the pharmacist would give the desired information. Thus while there are commercial aspects to some of the articles listed, there are also pharmacologic or therapeutic aspects to nearly all of them. Where the purely commercial aspects of display and merchandising are applicable, these should be included in the instruction of the division of commercial pharmacy, but the major portion of the work should be presented by the member of the staff who lectures on materia medica or pharmacology and should be linked up with remedial measures involving the use of drugs.

The course should be placed in the final year for at many points reference to other subjects in the pharmacy curriculum will be necessary. It is, in part, a summation course and requires a background of chemistry, operative pharmacy, physiology and pharmacology to avoid duplication and to conform to time limits.

DIVISION OF SUBJECT MATTER AND TREATMENT.

Owing to the variability of the subject matter it is rather difficult to provide an entirely satisfactory division of topics and one to which exception cannot be taken. A strict therapeutic classification, while it links up best with pharmacology or materia medica, is objectionable because a given article may be used for widely differing purposes. A basic materials classification is equally objectionable in that a given article may be manufactured in different materials or the finished article may consist of several basic materials. In order to minimize duplication and yet retain, as far as possible, the desirable features of both classifications, the work has been divided primarily into three sections as follows: I. Basic materials used in manufacture; II. Individual articles or appliances for specific therapeutic uses; III. Miscellaneous articles and procedures.

A consideration of basic materials necessarily brings in the matter of industrial processes and chemical technology, both of which may have been covered more completely at other points. The details of manufacture are reduced to those necessary for an understanding of differences in the articles included in the other divisions. The "Charters Report," page 253, has in part served as a model for this section of the work but as it is restricted to specific articles a consistent use of this scheme of treatment would involve much duplication. The basic materials con-

sidered are rubber, metals and enamelled wares, glass and porcelain and finally textiles and fabric materials. The details of treatment for each of these are given in the accompanying syllabus.

The second division, comprising sundries which have specific uses, is closely correlated with pharmacology or materia medica and shows in striking manner the reason for this work being done by one familiar with these correlated subjects. The articles in this division are a part of the materia medica and frequently play just as important a rôle as drug substances in the treatment of disease. The sub-divisions of this section include the following: application of heat and cold, irrigation, hypodermic and allied forms of administration, protection of surrounding materials, feeding accessories, temperature recording, bandaging and dressing materials, plasters, ligatures and sutures, hygienic appliances and finally miscellaneous appliances not otherwise covered.

The third division is one which allows of extreme elasticity and permits the introduction of various articles not included in the preceding sections and certain procedures not touched upon at other points in the curriculum of the particular school. With such a broad field as the retail pharmacy to choose from, one might possibly include many purely commercial items but our choice has been insecticides and rodenticides, fumigation and the more commonly used emergency or first-aid procedures. If additional time were available topics such as electrical appliances and foodstuffs, particularly infant and health foods, would be in order.

The course has been in operation for the past two years and is still undergoing modification as suggestions are received. During the past year, attempts were made to secure first-hand information regarding the extent of store stocks of the various articles included in the lectures. Inventory sheets were distributed to those working part-time in stores and were checked as to occurrence or nonoccurrence of the items. Incidentally the inventory sheet was suitable for study purposes and in some instances was not returned. A tabulation showed that in the main, the articles mentioned in the course were really included in the store stock.

Perhaps the greatest difficulty encountered in the establishment of the course was lack of sources of information. This difficulty, first apparent in the preparation of a section of a textbook in collaboration with Drs. Rusby and Bliss, while entailing an enormous amount of work in the preparation of lecture notes, leaves one free to use personal ideas in framing the course. There are no source books of information for most of the articles and my information had to be gained by personal interviews coupled with that to be had from catalogs or other publications of the manufacturers. When the objects of the course were made clear, I received very courteous treatment and was given valuable information. Not only did the manufacturing firms supply information but certain of them, accompanied the information with valuable exhibition material. It is difficult to attempt the work unless the student can actually see the articles dealt with in the lectures and we have, either by acquisition or outright purchase, obtained exhibits of practically all the materials included in the course. In certain instances we have had assistance from special lecturers but, owing to the limitations of time, they have had to be eliminated. Another factor which renders too great a dependency upon outside speakers inadvisable is that they are generally specialists and this is a general course. Many firms are in a position to send men to speak upon merchandising

and such speakers can give valuable assistance in commercial pharmacy. The most satisfactory results have been obtained by one individual carrying through the sundries work but at the same time maintaining contact with the lecturer in commercial pharmacy so as to correlate the commercial and pharmacologic aspects where this is possible.

In offering the following syllabus for a 32-hour lecture course, it is to be particularly noted that such a course has actually been in operation for two years prior to its publication in syllabus form. It therefore represents more than a plan on paper in that it has been subjected to the real test of experience under class room conditions. We have had ample opportunity to judge of its usefulness to the practising pharmacist and he is the one for whose benefit pharmaceutical education was primarily founded in this country.

SYLLABUS FOR COURSE IN PHARMACAL SUNDRIES.

INTRODUCTION.

General Considerations.
- Objects and Scope of Course.
- Definition of Pharmacal Sundries—articles and appliances used in connection with hygienic, medical and surgical treatment.
- Reasons for noninclusion surgical instruments, trusses and supporters.
- Sources of information—trade catalogs and publications.

Relations to commercial pharmacy and merchandising.
- Knowledge of articles an aid to salesmanship.
- Articles frequently only stocked by pharmacies.
- Factor of competition less because of immediate need.
- Profits ranging from 20% to 100%.
- Association of sales—nasal spray with atomizer.
- Desirability of correlation with courses in commercial pharmacy.

Relations to professional pharmacy.
- Therapeutic effects of many articles or their use as adjuncts to other treatment.
- Necessity of instructing purchaser in absence of direction by physician.

Divisions of subject matter.
- I. Basic materials and processes of manufacture.
- II. Articles used for specific purposes.
- III. Miscellaneous procedures.

I. BASIC MATERIALS AND PROCESSES OF MANUFACTURE. (Including rubber, metal and enamelled wares, glass and porcelain, fabrics and textile materials.)

A. Rubber.

- Chemical properties; complexity of composition; physical properties; geographical and botanical sources.
- Production of Crude Rubber—tapping of tree; coagulation or curing latex by smoking, chemical procedures or centrifugal; washing; drying; tank shipment.
- Production of Manufactured Rubber—milling; mixing to introduce vulcanizing agents, fillers and colors; vulcanizing agents, purpose and process; fillers, uses and abuses; rubberized fabrics.
- Manufacturer's Designations—molded and glass-molded as water-bottles and rectal tubes; calendared as rubber aprons; dipped as surgical gloves; blown as rubber ball; die-cut and pinched-seam as bathing caps; hand-made as overshoes.

Contrasts of seamless and seamed articles.
Contrasts of pure gum and rubberized fabric articles.
Hard Rubber, Vulcanite or Ebonite—preparation from rubber; advantages, rigidity, inert, less affected by solvents; displacement by Bakelite and similar products.

B. Metals.

Uses govern choice of metal; may be divided into—

1. Articles for intimate and long continued contact with tissues or body fluids; must be of inert metals as gold, silver, platinum, solid or heavy plated; mainly surgical appliances therefore not considered.
2. Articles for intimate but short contact with tissues or body fluids; of gold, silver or nickel plated ware, also polished steel and stainless steel; hypo needles, atomizer parts.
3. Articles not for intimate contact with tissues or body fluids; of tin, copper, zinc, but more often enamelled ware.

Enamelled Ware—manufacture by shaping iron plate; welding or crimping seams, enamelling; advantages and disadvantages in contrast with other metallic wares and with glassware.

C. Glass and Porcelain.

Manufacture and technology.
Manufacturer's types—molded, pressed, blown.
Advantages and disadvantages of glassware as contrasted with enamelled wares.

D. Fabrics and Textile Materials.

Cotton—most used for purpose in medicine.

Botanical and economic aspects; chemical composition of raw and refined; U. S. P. definition.
Gathering and preliminary preparation—picking; ginning; cleaning.
Manufacture of loose or fibre cottons—chemical treatment with alkalies, acids, bleaches and subsequent washings; drying; carding; felting.
Manufacture of fabric—spinning; weaving; looms; thread count; bleaching; washing.

Linen—contrasts with cotton; reasons for lesser use.

Botanical aspects; production fibre and seed.
Preliminary preparation fibre—retting; separation.
Manufacture of fabric—similar to cotton.

Wool—contrasts with cotton.

Source—finer grades by shearing.
Preparation—washing; wool-fat U. S. P.; cleaning; carding; felting.

II. Articles Used for Specific Purposes.

A. Application of Heat and Cold.

Heat as a remedial measure—dry through use of hot-water bottle, heating pad, lamps, air heaters; moist heat through use of wet dressings; physiological effects each; uses each.
Cold as a remedial measure—dry cold through use water-bottle, ice bag, water coils; moist heat through use wet dressings and baths; physiological effects contrasted with heat; uses.
Appliances for application heat—hot-water bottles; forms—standard, head, spinal, ear, Sprague ear, face; capacities; caution against boiling water; storage when not in use; electric heating unit in stopper; may also be used for application cold. Electric heating pad—form; caution against wet.

Waterless heaters—form; refills. Metal hot-water bottles—form; contrast with rubber; use as bed warmers.

Appliances for application cold—ice bags—rubberized fabric *vs.* pure gum; forms—flat or English, face and ear, throat or tonsillectomy, spinal, cap. Water coils—forms, head and abdominal; contrast with ice bags.

B. Appliances for Irrigation Purposes.

General purposes irrigation—lavage; relieving obstruction; supplying liquids; therapeutic actions as anthelmintics, astringents, antiseptics.

Typical solutions or medicaments used in irrigation.

Appliances used for irrigation:

Rubber syringes—types as fountain or gravity-flow and compression; forms—fountain, bulb, infant, ear and ulcer, vaginal; tips and fittings; combinations.

Metal syringes—nickel-plated; construction; capacities; tips—nasal, aural, urethral, catheter, rectal.

Glass syringes—construction; rubber bulb types; capacities; advantages over others; tips and fittings.

Irrigator cans—enamelled and glass; capacities; fittings and tubing.

Catheters—uses; technic in introduction; types—soft rubber, glass, woven, return-flow; sizes or gauge; gauge numbers often applied to tubings.

Rectal and colon tubes—uses; with rubber bag or irrigator can; gauge numbers; differences in length.

Tubings—types—irrigator, drainage, stethoscope, suction, Carrel-Dakin; sizes in terms bore.

Bed and douche pans—materials used in manufacture; forms; cleansing and sterilization.

Stomach pumps and tubes—uses in poisoning; lavage and test meals; technic of introduction; forms.

Nasal douches—uses; forms—Bermingham type, rubber bulb, siphon; typical solutions used.

Atomizers and nebulizers—construction; types for aqueous, oily, corrosive materials; uses; medicinal substances used for antiseptic, astringent, stimulant, protective, local anaesthetic purposes.

C. Appliances for Hypodermic and Allied Forms of Injection.

General contrasts of this with other methods administration commonly used.

Hypodermic, intradermal, intramuscular, intravenous, spinal, transfusion—site of injection each; typical medicaments for each; contrasts each as to rapidity of action.

Pharmaceutical preparations—hypo tablets, ampuls, sterile solutions, biologicals; methods of sterilization and importance.

Appliances used—importance sterilization.

Hypodermic syringes—construction; capacity; graduation; forms; care; legal aspects.

Hypodermic needles—materials and construction; various gauges and lengths for different uses; care; legal aspects.

D. Appliances Used for Protective Purposes (excluding bandaging and dressing materials).

Rubber sheeting—uses; market forms; trade sizes.

Air cushions—uses; market forms.

Finger cots—uses; leather and rubber forms.

Gloves—uses; surgical and household forms; sizes; care in use and preservation.

E. Appliances for Feeding Purposes.

Nipples—commercial forms; sizes; cleansing.

Nursers, baby bottles—forms; capacities; cleansing; pasteurization in infant feeding.

Feeding cups and spoons—forms of each; uses.

Intestinal feeding—absorption; apparatus required; typical foodstuffs for method.

F. Thermometers and Temperature Recording.

General considerations—points at which temperature may be taken; heat regulatory apparatus of body; variations in normal temperature; variations due to abnormal conditions; relations to pulse rate and respiration.

Thermometers—manufacture; graduations; forms—clinical oral and rectal, household, bath chemical; method of use; reading time; cleansing after use; certification.

G. Bandages and Dressing Materials.

General purposes—absorption, protection against foreign materials, support, medication, covering.

Cotton—manufacture (refer to basic materials); absorbent and nonabsorbent; bleached and unbleached; sterilization; medicated moist and dry; market packings.

Gauze and gauze bandages—manufacture (refer to basic materials); thread count; plain and medicated; moist and dry; widths and lengths bandages; finger bandages; sterilization; market packings.

Muslin—contrast with gauze; sizes and packings.

Elastic bandages—manufacture; with and without rubber; advantages each type; length stretched and slack; uses; market packings and sizes.

Packing strips—medicated and nonmedicated; uses; market packings.

Bandage compress—form; uses; market sizes.

Medicated pads—picric acid, mercurochrome; uses.

Tape dressings—form; uses.

Stockinette—manufacture; form; use with plaster bandage.

Plaster Paris—manufacture; uses; method application; market sizes and packings.

Esmarch bandage—form; emergency uses.

Lint—contrasts with cotton bandages; uses; market forms.

Wool—manufacture (refer to basic materials); forms sheet, rope, tampon; uses tampons; market packings.

Oakum and jute—contrast with cotton; little used.

Impervious bandaging materials—general uses, protection, covering; nonadherent; disadvantages.

Oiled fabrics—manufacture; silk and muslin; uses; preservation; market packings.

Waxed fabrics—manufacture; muslin and gauze; use in burns; market packings.

Waxed and oiled papers—contrasts with others; uses.

Gutta percha—source and manufacture; properties; sheet and stick forms; dental and supporting uses; market packings.

H. Plasters.

General uses—protection, support, medication.

Basic materials—resins and waxes, lead oleate, rubber; advantages and disadvantages each.

Rubber base plasters—manufacture; U. S. P. specifications; uses; market packings.

Medicated plasters—manufacture; forms of medicament; official—Belladonna, Capsicum, Cantharides, Mustard; specifications for each; nonofficial

market plasters; medicinal actions official and nonofficial; market packings and forms.

Court plaster—manufacture; contrast with adhesive; market forms.

Corn and bunion plasters—medicated and nonmedicated; uses each; market forms and packings.

I. Ligatures and Sutures.

Definitions of terms.

Types material used—catgut, silk, kangaroo tendon, horsehair, silkworm gut, fascia or skin, linen, wire.

General considerations—absorbable and nonabsorbable; sterile and nonsterile; dry and moist; boilable and nonboilable; emergency tubes; tubes, packets, loose.

Catgut—source and manufacture; absorption; chromic or hard gut; sterilization; sizes or gauges; emergency tubes and other market forms.

Silk—source and manufacture; forms twisted and braided; colors; nonabsorbable; capillarity; contrasts with gut; sterilization; sizes or gauges; market packings.

Kangaroo tendon—source and preparation; contrasts with gut; sterilization; sizes and lengths; market forms.

Horsehair—source; nonabsorbable; contrasts with others; importance sterilization; market forms.

Silkworm gut—source and preparation; nonabsorbable; contrasts with others; lengths and sizes; sterilization; noncapillarity; market forms.

Fascia or skin—source and preparation; colors; contrasts with others; market forms.

Linen thread—source; nonabsorbable; lengths and sizes; colors; capillarity and coating; market forms.

Wire—silver; special uses; lengths and B. & S. gauges

Needles—only relation in emergency tubed sutures; types—full curve, half curve, straight; points—taper, triangular, spear, regular; eyes—regular, round, square; body—round, flat, square.

J. Hygienic Appliances.

Suspensories—form; fabrics; sizes; jock-straps and athletic supporters; uses.

Sanitary napkins—forms; modern cellulose products as filling; sizes; uses; disposal in relation to plumbing

Napkin belts—forms; sizes; uses.

Preventives—forms; uses; legal aspects

Pessaries—forms; materials; uses; legal and surgical aspects.

Prophylactics—forms; ointments and liquids; medicaments; uses; relations to public health.

K. Miscellaneous Appliances Not Otherwise Considered.

Urinals—forms male and female; glass and enamelled.

Pus basins—forms—kidney-shaped, triangular, square; glass or enamelled ware; uses.

Inhalers and croup kettles—construction; types—water kettle, jacketed, direct heating, electric; uses; typical medicinal substances used.

Eye cups—forms metal and glass; clear and colored; typical solutions used; importance filtration, cleanliness.

Medicine glasses and spoons—forms of each; graduations; preference to household utensils.

Breast pumps—forms; uses.

Nipple shields—forms; uses.

Protoclysis or drip apparatus—Murphy drip; fittings and accessories; arrangement of apparatus; solutions used.

III. Miscellaneous Articles and Procedures.

A. Insecticides and Rodenticides.

General considerations—definitions of terms; economic importance of control; labelling requirements and inert matter; sources—vegetable, chemical, biological; forms used—liquids, solids, gases.

Insecticides—stages in life cycle insects; stomach poisons, contact poisons, repellants; methods application—spray, blower, fumigation; division into those of agricultural interest and those of household importance; general measures—cleanliness, light, dry.

Household insects—moths, flies, roaches, bedbugs, mosquitos, fleas; means of prevention and combatting; substances used in control.

Rodenticides—habits; methods of combatting—mechanical, poisons, fumigants, repellants, biologicals; contrasts of efficiency; typical substances used in each method.

B. Fumigation.

General considerations—historical; action on bacteria and vermin; agents in use (except agricultural).

Preparations for fumigation—sealing and closure; moisture; protection metal articles; placing fumigant.

Cautions after fumigation—entering room; air circulation; caution with HCN.

Quantities fumigant required—room measurements.

Sulphur—formation dioxide on burning; penetrative power; effects on vermin and bacteria; effects on metals and colored articles; efficiency increased by moisture; market forms for purpose.

Formaldehyde—formation from paraformaldehyde in burning; penetrative power; effects on vermin and bacteria; no effects on metal and colored articles; efficiency increased by moisture; market forms for purpose.

Cyanogen—from cyanides by action acids; penetrative power; effects on vermin and bacteria; no effects on furnishings; caution regarding thorough sealing and entry after use; chief use on ships and in warehouses; ordinances governing use.

C. First Aid and Emergency Treatment.

General considerations—limitations; must not be more than temporary treatment pending arrival medical aid; drug store often first resort after injury or accident.

General procedures—summon medical aid; place injured in comfortable position; check bleeding; temporary wound dressing; relieve shock.

Control of bleeding—elevation injured member; application of pressure, manual or by tourniquet; characters of arterial, venous and capillary bleeding; points at which pressure applied; internal bleeding; nose bleed.

Wound dressing—temporary, leaving permanent to physician; cleanliness; use of antiseptics; compresses.

Treatment of shock or faintness—position of body and head; application heat; stimulants; rest.

Burns—first, second and third degree, differences; emergency treatment each type; medicinal agents used in treatment; severe sunburn

Sunstroke—symptoms and emergency treatment.

Heat prostration—symptoms and emergency treatment

Fainting—emergency treatment.

Epileptic seizures—emergency measures.

Frostbite—emergency treatment.
Sprains—nature; symptoms; temporary treatment.
Strains—nature; symptoms; temporary treatment.
Dislocations—nature; symptoms; temporary measures.
Fractures—nature; classification—simple, compound, comminuted; symptoms; temporary treatment and transportation.
Artificial respiration—accidents requiring this treatment; mechanical devices; summon medical aid but meanwhile start process; prone pressure method—sequence and time of steps; conserving body temperature; after-treatment.

COLUMBIA UNIVERSITY, SCHOOL OF PHARMACY.

Opthalmic counter, Lascoff Pharmacy—here Opthalmic preparations only are dispensed.

AN ANCIENT EYE DOCTOR.

A stamp belonging to a Roman eye doctor who practiced in London about 300 A.D. was recently discovered during the course of excavation work near London Bridge. It was made of a flat stone, two inches square and three-eighths of an inch thick. On the four narrow sides had been carved the name of the doctor, Caius Silvius Tetricus, and his prescriptions for four eye troubles. The stamp was apparently used to impress the doctor's name on his preparations, which were made in the form of solid sticks, resembling sticks of sealing wax.

OPIUM PARLEY IN SIAM.

John K. Caldwell, foreign service officer with the rank of Consul General and State Department authority on opium questions, is attending as an observer the conference on the use of opium in the Far East which opened at Bankok, Siam, November 9th.

Mr. Caldwell will be assisted by Colonel Lucien R. Sweet, Chief of Staff of the Philippine Constabulary, who is thoroughly informed on the administration of Philippine narcotic laws.

THE QUALITY OF TINCTURE OF DIGITALIS DISPENSED BY PHARMACISTS.*

BY ROBERT P. FISCHELIS.

In view of certain statements made in the Spring of 1930 at the hearings before the Senate Committee on Agriculture and Forestry on the quality of drugs dispensed by the pharmacists of the United States, the Board of Pharmacy of the State of New Jersey took steps to inquire into the situation as far as this state is concerned. One of the preparations which was said to be furnished to the public in sub-standard form was Tincture Digitalis.

The Board therefore decided to determine the quality of Tincture Digitalis furnished to retail druggists of New Jersey by various manufacturers, and also the quality of the Tincture Digitalis supplied to the public by pharmacists on the prescriptions of physicians.

Samples of Tincture Digitalis were purchased in original four-ounce containers directly from nine representative manufacturing and wholesale houses. In eight cases out of the nine, the product was labeled to meet the U. S. P. requirements. One sample, that of a wholesale house, was labeled "U. S. P. Eighth Revision." In view of the fact that the present U. S. P. is the Tenth Revision and that both the Ninth and Tenth Revisions required Tincture Digitalis to be biologically assayed, while the Eighth Revision did not, it appeared that this manufacturer labeled his product "U. S. P. Eighth Revision" in the expectation that he could escape responsibility for a biological assay. This product was the only one which was not labeled as having been biologically assayed. The other eight products bore a distinct statement on the label to the effect that the Tincture had been biologically assayed and found to meet the U. S. P. X requirements. One sample bore a date of manufacture, and one sample bore a date of test.

All of these tinctures were subjected to biological assay by an expert. It should be recalled that biological assay methods have not reached the state of perfection that is common to chemical assay methods. The U. S. P. standard for Tincture Digitalis makes due allowance for the variation in the reaction of test animals to this potent tincture. The standard prescribed is stated in part as follows: "Tincture Digitalis injected into the ventral lymph sac of a frog has a minimum systolic dose of not less than 0.0055 cc. and not more than 0.0065 cc. for each Gm. of body weight of frog." If we assume that a Tincture Digitalis having a minimum systolic dose of 0.006 cc. for each Gm. of body weight of frog is a 100% tincture, then the range of percentage as given in the Pharmacopœia is approximately from 92% to 108%. In other words, the upper limit, according to the U. S. P. X standard, would be a tincture of approximately 108% activity, and the lower limit, approximately 92% activity. Any tincture purchased in the open market, or any tincture dispensed on a prescription, which would come within the range of 90% to 110% could be considered, for all practical purposes, as meeting the requirements of the U. S. P. for physiological activity. This allows a total variation range of 20%.

The nine samples tested showed a range of activity from 83% to 108%. Two samples showed an activity of 83%. Three samples were 90% active. Two

* Section on Practical Pharmacy and Dispensing, A. PH. A., Miami meeting, 1931.

samples were reported 98% active, and the remaining two showed an activity of 108%. It will be seen, therefore, that only two out of the nine samples were appreciably below the lower limit of the U. S. P. standard of activity. One of these samples was the product labeled "U. S. P. Eighth Revision" and without a statement as to whether it had been biologically assayed. We can conclude from the results of this examination that seven out of nine products furnished by manufacturers to retail druggists in New Jersey were practically of U. S. P. quality.

When it is considered that Tincture Digitalis may deteriorate upon standing, it would seem justifiable to call the attention of manufacturers to the necessity for not only maintaining their product within the U. S. P. limits of activity, but also endeavoring to keep as far above the lower limit and as near to the 100% mark as possible.

It is interesting to observe that the product bearing the date of manufacture on the label was assayed three months and twenty-two days after the date of manufacture, and found to be 98% active. The sample purchased from the manufacturer who placed the date of test on the label was assayed one month and two days after the date of their test, and found to be 90% active. The system of placing the date of manufacture on the labels of products which are prone to deterioration is to be commended as being in the interests of the public health. When more definite information is available on the question of deterioration, it will be in the interest of the public health for manufacturers to exchange outdated original packages of pharmaceuticals on the same basis as biological products are now handled.

QUALITY OF TINCTURE DIGITALIS SUPPLIED BY PHARMACISTS ON PRESCRIPTIONS.

In order to obtain samples of Tincture Digitalis as dispensed on physicians' prescriptions by retail druggists in the regular course of their daily work, we presented twenty-four prescriptions, each calling for one fluidounce of Tincture Digitalis U. S. P., to twenty-four retail drug stores located in twenty of the twenty-one counties of the State of New Jersey. The identity of the ultimate recipient of the prescriptions was not revealed until the prescription had been compounded, delivered to the agent of the Board and paid for. The agent then divided the prescription, retaining one-half of it in the original container and sealing it with the seal of the Board, and leaving the other half with the druggist who filled the prescription, also sealing this with the seal of the Board at the same time. The original prescriptions were assayed by an expert according to the U. S. P. biological assay method. An additional check test was made in each case, using the Reed & Vanderkleed Guinea Pig Method.

The percentage of physiological activity in these prescriptions was calculated on the same basis as in the manufacturers' samples noted above. The activity in twenty-two out of the twenty-four prescriptions came practically within the upper and lower limits specified in the U. S. P. Five prescriptions had an activity of 90%; eleven prescriptions showed an activity of 98%; and six prescriptions showed an activity of 108%. One prescription was 120% active, or 12% above the upper U. S. P. limit, and one prescription was only 77% active, or 15% below the lower U. S. P. limit. It will be noted, therefore, that out of the twenty-four samples collected on prescriptions from retail druggists, only two were appreciably "off standard."

We communicated with each pharmacist within a few days of the date on which the prescriptions were filled, asking him to advise us whether or not he had manufactured the Tincture Digitalis himself, and if not, to give us the name of the manufacturer. Two of the twenty-four pharmacists did not reply to our communication. Two stated that they had made the tincture from Fluidextract of Digitalis by dilution. In one case the tincture thus prepared showed an activity of 98%, and in the other case it was 108%. Nineteen others stated that they had dispensed a manufacturer's tincture. One pharmacist stated that he had filled the prescription from a manufacturer's container, but as he had the tincture of several manufacturers on hand, he could not recall which manufacturer's product had been used in this particular case. By a peculiar coincidence, all of the manufacturers named by the retail druggists, with the exception of one, were included in the group whose products had been purchased direct and had been assayed by us.

The conclusions to be drawn from this investigation are that, in general, the pharmacists of New Jersey are receiving a good quality Tincture Digitalis from manufacturers and wholesalers, and that the public in turn is receiving a good quality Tincture Digitalis on prescriptions compounded by these pharmacists. Even though some of the samples of this tincture supplied were somewhat above and somewhat below the maximum and minimum standards designated by the U. S. P., the discrepancies were, in no sense, of a nature to endanger the health of persons requiring the action of this tincture. Claims to the effect that persons suffering from heart conditions requiring the use of Digitalis are dying because of the poor quality of Tincture Digitalis furnished by pharmacists, seem to be entirely unfounded in fact, as far as this investigation is able to disclose the facts.

A number of interesting observations in connection with this work could be made. In the first place, it seems advisable to caution pharmacists to read the labels on all preparations which they buy from manufacturers. There is still a tendency on the part of some manufacturers and wholesalers to make evasive statements on their labels, which may get the retail pharmacist into trouble.

Manufacturers who give pharmacists and physicians some idea of the age of the products which they dispense, by dating them, are to be commended.

No attempt was made in this investigation to select pharmacies which specialize in prescription work. The prescriptions for Tincture Digitalis were filled in the average type of corner drug store found throughout the State of New Jersey.

IBSEN AND PHARMACY.

Henrik Ibsen was apprenticed to a pharmacist, Jens Aarup Reimann, at Grimstad, in 1844, and remained with his successor, Lars Nielsen, until April 1850. The original pharmacy in which Ibsen spent six years has been replaced by a new building and is known as the "Ibsen House;" the fittings of the old pharmacy have been retained in the new premises. Ibsen wrote "Catalina" before discontinuing his pharmaceutical work, and gave to Norway and the world such plays as "Brand," "Peer Gynt," "A Doll's House," "Hedda Gabler" and "Ghosts"—Ibsen brought Norway back into the literary world and made men and women think.

Red Cross Roll-Call comes between Armistice Day and Thanksgiving.
Christmas Seals are on sale until Christmas.

WILLIAM LEWIS.*

BY EDWARD KREMERS.

While editing the *Library of the Massachusetts College of Pharmacy*, a catalog published in 1829, the writer had occasion to comment on an item: *Lewis's Chemistry (1746)*. The item does not reveal the exact title of the book, but fortunately the date admits of its identification with an item in Bolton's *A Select Bibliography of Chemistry, 1492–1892.*[1] The catalog also contains an item *Lewis's Materia Medica*, 2 vols. with which the writer has been acquainted these many years. However, he did not know whether the name Lewis represented one author or two authors. Bolton records in Section V of his *Bibliography*, an E. R. Lewis as author of two chemical treatises, the one published in 1876, the other in 1879. Hence this name could not come under consideration. He also records a treatise by Polydore Lewis published in London in 1790, as well as Wm. Lewis who published *A Course of Practical Chemistry* in London in 1746, as well as several other treatises. Inasmuch as the copy of Lewis's *Dispensatory* available in the University Library does not contain the author's name, hence initials, on the title page, the writer was at a loss to know whether the two Lewis were identical or two distinct persons.

Naturally, he first consulted Wootton's *Chronicles of Pharmacy* as the text of an Englishman, only to find that the name Lewis did not even occur in the index. Next he turned to LaWall's *Four Thousand Years* but again he did not find the name in the index. Thinking that a reference to him might be found under "*Dispensatory*," he looked once more but again was disappointed. So he turned to his old standby Schelenz, *Geschichte der Pharmazie* and there, as one of the numerous representatives of the 18th century, he found the following item:

"William Lewis ausser einem *Course of Practical Chemistry*, London, 1746, ein *New Dispensatory containing the Theory and Practice of Pharmacy*, London 1753, 1765, und ins Deutsche uebersetzt, Hamburg 1768."[2]

Under the "Education of Prospective Apothecaries," Schelenz enumerates among the textbooks Lewis' *Neuem Engl. Laborator.*[3] If the first item points to the identity of the author of Lewis' *Chemistry* of the Massachusetts College of Pharmacy with that of the author of Lewis' *Materia Medica*, here we have another item that rouses our curiosity as to the author. Unfortunately, Bolton throws no light on this aspect of our subject.

Frederking does not list the name Lewis in the index although this author's *Grundzuege der Geschichte der Pharmacie* is little more than a catalog of names of men associated with our calling.

Phillippe-Ludwig[4] record a Mariwether Lewis and a Will. Lewis in the index. On page 280 we find a reference to the French translation of 1803 of the latter's *Neues Dispensatorium*. On page 346 they list the name of W. Lewis among the representatives of the 18th century. On page 588 they record the information copied by

* Section on Historical Pharmacy, A. PH. A., Miami meeting, 1931.

[1] *Smithsonian Miscellaneous Collections*, No. 850, Washington, 1893.

[2] Schelenz, *Geschichte der Pharmazie*, page 566.

[3] *Ibid.*, page 592.

[4] *Geschichte der Apotheker*, 1855.

Schelenz with the omission of the preposition "of." On page 693 Lewis is mentioned with others as contributing some of the secrets of metallurgy. Mariwether Lewis, we learn (page 859) was a botanist who collected in this country in 1804.

C. J. S. Thompson[1] refers to Lewis' *New Dispensatory* containing commentaries on the London and Edinburgh Pharmacopœias.

As a last resort, the writer turned to Bell and Redwood.[2] The index has an item "Lewis, Rev. Dr., *Dispensatory*, 30." Looking up the reference, we find: "The first Edinburgh Pharmacopœia was published in 1699.... Four years afterward, Dr. Lewis published an English translation, under the title of *The New Dispensatory*. This work contained much additional information and was attended with great success...."

The writer has frequently been asked to write a History of Pharmacy. He has endeavored these many years to make contributions toward a history of pharmacy, but how a history of our calling can be written satisfactorily when we have no foundation upon which to build has always perplexed him. Biography may be considered as constituting the A, B, C of history, but when we do not know our alphabet, it is difficult to see how we should spell our words, construct phrases and sentences, let alone paragraphs. To write about historical subjects in pharmacy has tempted many a person and some have written with considerable success, but a history of pharmacy deserving the name has not yet been written by any one, though attempts in this direction have been made.

If the dearth of information in our so-called histories of pharmacy is provoking, the title "Rev." in the index of Bell and Redwood naturally is provocative of curiosity. Since Lewis made no experimental contributions to chemistry, we are not surprised that his name is not mentioned in the histories of chemistry, though, naturally, Bolton lists his books in the *Select Bibliography of Chemistry*. Fortunately, however, Lewis, as a writer, was a man of sufficient importance to receive consideration in the *Dictionary of National Biography*.

Lewis, William (1714–1781), chemist, son of John Lewis of London, was born in 1714. He matriculated at Christ Church, Oxford, on 17 March 1730–1, graduated B.A. in 1734, and proceeded M.A. 1737, M.B. 1741, M.D. 1745. At the opening of the Radcliffe Library in 1749 Lewis delivered the oration. He practiced as a physician, and in 1745 was living in Dover Street, London, but shortly afterward removed to Kingston-upon-Thames. On 31 Oct. 1745 he was admitted F. R. S.; he died on 21 Jan., 1781. Lewis was eminent for his writings on the Pharmacopœia. His chief works were: (1) *A Course of Practical Chemistry*, London, 1746, 8 vo. (2) *Pharmacopœia Edinburgensis*, London, 1748, 8 vo. (3) *The New Dispensatory*, London, 1753, 8 vo., Edinburgh, 1781, 1791. (4) *Experimental History of the Materia Medica*, London, 1761, 4 vo; 2nd edit. 1768; 3rd edit. by J. Aiken, 1784; German translation, 1771. (5) *Commercium Philosophico-Technicum*, London, 1736, to 46. He also published translations of Caspar Neuman's chemical works in 1759, and (posthumously) of Hoffman's *System of the Practice of Medicine*, 1783. Two papers by him on platinum appeared in the *Philosophical Transactions* for 1754 and 1757, respectively. In 1767 the Society for the Improvement of Arts, Manufactures, etc., of which he was one of the founders, awarded him a gold medal for an essay upon *Potashes*.

(Nichols' *Lit. Anecd.* IX, 764; Foster's *Alumni Oxon.* 1715–1886; *Georgian Era*, iii, 484; Thomson's *Hist. Royal Soc.*; Watt's *Bibl. Brit.*)

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[1] *The Mystery and Art of the Apothecary*, page 150.

[2] Jacob Bell and Theophilus Redwood, *Historical Sketch of the Progress of Pharmacy in Great Britain*.

From the bibliographic account which follows, it will become apparent that Lewis was not only a prolific writer but that his literary productions met with favor among the scientific reading public, several of his treatises having been translated into foreign languages. He himself was the translator of several books by German scientists written originally one in Latin and the other in German. Even his Radcliffe oration, delivered and published in Latin, was printed a second time.

The arrangement is chronological in accordance with the dates of the first editions.

A Course of Practical Chemistry. In which are contained all the operations described in Wilson's "Complete Course of Chemistry," with many new and several uncommon processes. To each article is given the chemical history, and to most, an account of the quantities of oils, salts, spirits yielded in distillation, etc., from Lemery, Hoffman, the French Memoirs, Philosophical Transactions and from the Author's own experience. London, 1746, pp. (xliii)—432, 8 vo. Plates.

Bolton, *Select Bibliography*, Part V.

Cat. Surg. Gen. Libr.: 10 p.l., 432, pp., 21 l., 7 pl., 8° London, J. Nourse, 1746.

Br. Mus. Cat.

A copy of this book was contained in the Library of the Mass. Coll. Pharm. at the time the catalog thereof was printed in 1829.

Medical essays and observations, published by a society in Edinburgh, in six volumes, abridged and disposed under general heads in two volumes. 2 v. 508, 512 pp., 14 l. 8°. London, C. Hitch & T. Astley, 1746.

Cat. Surg. Gen. Libr.

The Pharmacopœia of the Royal College of Physicians at Edinburgh. Faithfully translated from the Fourth Edition. With useful Notes on the Materia Medica and Practical Observations on the Preparations, both Simple and Compound. To which are added The Prescriptions, as well Extemporaneous as Official, in Use at the Royal Hospital. By W. Lewis, M.B., F.R.S., London: Printed for John Nourse, at the Lamb, opposite Katherine-street in the Strand. MDCCXLVIII. 8 vo., pp. XIV, 336. Appendix. The Dispensatory for the Use of the Poor, in the Royal Hospital at Edinburgh, pp. 337 to 362. Index, pp. 37.

Libr. Univ. Wisc. The title page reveals the signature of Ralph Assheton, 1758, also that of Col. Daniel Udree. On the inside of cover the book plate of Ralph Assheton, M.D., of Philadelphia. On the last page an advertisement of Lewis' *A Course of Practical Chemistry.*

Cat. Surg. Gen. Libr. under Royal: 7 p.l., 362 pp., 19 l., 8°.

Br. Mus. Cat.

4th ed. by John Rotheram 1794 in Libr. Univ. of Wisc.

Lewis, (William) M.D. Oratio in Theatro Sheldoniano habita Idibus Aprilis, MDCC.XLIX. die dedicationis Bibliothecae Radclivianæ. Oxonii, 1749.4°.

Br. Mus. Cat.

Editio secunda. Oxonia, 1749.4°.

Br. Mus. Cat.

The New Dispensatory containing:

I. The Theory and Practice of Pharmacy.
II. A Distribution of Medicinal Simples, According to Their Virtues and Sensible Qualities; the Description, Use and Dose of Each Article.
III. A full Translation of the London and Edinburgh Pharmacopœias; with the Use, Dose, etc., of the several Medicines.
IV. Directions for Extemporaneous Prescription; with a select number of elegant Forms.
V. A collection of Cheap Remedies for the Use of the Poor.

The Whole interspersed with Practical Cautions and Observations.

Intended as a Correction, and Improvement of Quincy.
London, Printed for J. Nourse, opposite Catherine Street in the Strand. MDCCLIII. 8 vo. pp. XII, 664.

Libr. Univ. Wisc. The copy bears the signature of Cap: Archd: Grant, 1756; also a partly destroyed book plate with the motto "Iehova Jireh." This book plate is apparently identical with that in the fourth edition of *The Edinburgh New Dispensatory* edited by John Rotheram and published in 1794, *viz.*, that of S.r Archibald Grant of Monymoske Bart.

Cat. Surg. Gen. Libr., 2nd ser., 4, p. 429; 9, p. 507. "VI(31.)XXXII, 664 pp. 8°. London, J. Nourse, 1753."

The Lloyd Library has a copy of this edition.

Br. Mus. Cat.

(2) Schelenz (*Geschichte*, p. 566) mentions an edition published in 1760. Apparently, this is the second edition which, according to the same historian, was translated into German and published in Hamburg in 1768.

(3) "The same, 3rd ed., VIII (2 l.), 692 pp., 8°, London, J. Nourse, 1770."

Cat. Surg. Gen. Libr. 2nd ser. 4, p. 429; 9, p. 507.

The Lloyd Library has a copy of this edition also.

(4) "The same 4 ed., corrected, with large additions, VIII (2 l.).

The Chemical Works of C. Neumann, abridged and methodized. With large additions, containing the later discoveries and improvements made in chemistry and the arts depending thereon, by William Lewis, London, 1759, pp. [xvi]–586–[xxxviii], 4°.

With a critical list of Neumann's works.

Bolton, Select Bibliography, Part V.

Second edition, London, 1773. 2 vols. 8°.

Bolton, Select Bibl., Part V.

Cat. Surg. Gen. Libr.

An Experimental History of the Materia Medica, or of the Natural and Artificial Substances made use of in Medicine: Containing a Compendious View of their Natural History, an Account of Their Pharmaceutic Properties, and an Estimate of Their Medicinal Powers, so Far as They Can Be Ascertained by Experience, or by Rational Induction from Their Sensible Qualities. By William Lewis, M.B., F.R.S. Rationalem quidem puto Medicinam esse debere: instrui vero ab evidentibus. Celsus. London, Printed by H. Baldwin, for the Author; and sold by R. Willock, at Sir Isaac Newton's Head in Cornhill. MDCCLXI. 4 to pp. XXIV, 591. Index, pp. 331.

Libr. Univ. Wisc.

Cat. Surg. Gen. Libr. XXII, 1 l., 591 pp., 16 l., 4°, London, H. Baldwin (1761).

(2) The same. 2nd ed., XXIV, 622 pp., 16 l., 4°, London, R. Baldwin, 1768.

Cat. Surg. Gen. Libr.

Br. Mus. Cat.

(3) The same. With numerous additions and corrections by John Aikin, 3rd ed. XXIII, 691 pp., 16 l., 4°, London, J. Johnson, 1784.

Cat. Surg. Gen. Libr.

(4) The same. 2 v., 4 ed., with numerous additions and corrections by John Aikin, XXXV, 504, 495 pp., 17 l., 8°, London, J. Johnson, 1791.

Cat. Surg. Gen. Libr.

Br. Mus. Cat.

Herrn Wilhelm Lewis, M.B. und der Koenigliehen Akademie der Wissenschaften in London Mitglieds Materia Medica, oder Beschreibung der einfachen Arzneymittel. Nach der zwoten vermehrt- und verbesserten Ausgabe aus dem Englischen uebersetzt von Joh. Heinrich Ziegler, M.D. der Gesellschaft fuer die Aufnahme der Kuenste, Wissenschaften und Handlung in London, der Physicalisch-Medicinischen in Basel, und der Naturforschenden Gesellschaft in Zuerich Mitglied. Zuerich, bey Orell, Gessner, Fuesslin und Compagnie, 1771, 4 to, XXVIII, 635.

Libr. Univ. Wisc.

692 pp., 8°, Dublin, J. Potts, 1778.

Cat. Surg. Gen. Libr. 2nd ser.

New (The) Dispensatory, containing: I. The elements of pharmacy. II. The materia medica, or an account of the substances employed in medicine; with the virtues and uses of each article, so far as they are warranted by experience and observation. 4th ed., corrected, with large additions, by William Lewis. 8°. Dublin, 1778.

Cat. Surg. Gen. Libr.: "Lewis."

The *Br. Mus. Cat.* gives the date of the fourth edition as 1781.

(5) Fifth edition, London, 1785, 8°.

Br. Mus. Cat.

The Lloyd Library has a copy of this edition.

(6) Sixth edition, pp. VII, 606. Fittingrave: London, 1799, 8°.

Br. Mus. Cat.

This edition also may be consulted in the Lloyd Library.

Phillipe-Ludwig (*Gesch d. Apotheker*, p. 280) make mention of a French translation published in 1803, but do not state on which edition of the English original it was based.

——. The same. Conhecimento pratico dos medicamentos, ou nova pharmacopéa, que comprehende:

I. A chymica pharmaceutica.

II. Os nomes, descripção, qualidades, propriedades, virtudes, doses e usos dos medicamentos simplices.

III. As preparações e composições das pharmacopéas de Londres, Edinburgo, etc.

IV. As formulas ou receitas escolhidas dos hospitaes ingleses, as dos medicos mas acreditados, etc.

Traduzida, correcta e augmentada de notas por Caetano José de Carvalho. 3 v., 8°. Lisboa, Imp. regia, 1815.

Cat. Surg. Gen. Libr. 2nd series.

Just as Lewis' first edition was intended as an "improvement of Quincy," so a number of editions from 1786 on were "improvements" by Duncan. From the bibliographic account here recorded, it would appear that these "improved" editions of Lewis' Dispensatory were published contemporaneously with the later editions published by Lewis himself. Unfortunately the writer has not had an opportunity to compare these parallel editions as they might be termed.

The New Dispensatory.....being an attempt to collect and apply the later discoveries to the Dispensatory published by W. L..... With new tables of Elective Attractions.....by a Gentleman of the Faculty at Edinburgh (A. Duncan). Edinburgh, 1786. 8°.

Br. Mus. Cat.

The Edinburgh Dispensatory; being an improvement upon the New Dispensatory of Lewis.....Second edition, with.....alterations.....and additions (by A. Duncan). Edinburgh, 1789. 8°.

Br. Mus. Cat.

Third edition, with.....additions, etc. (Edited by A. Duncan.) Edinburgh, 1791. 8°.

Br. Mus. Cat.

Fifth edition, with.....additions and.....account of the new chemical doctrines published by Mr. Lavoisier, pp. XXXI, 622. W. Creech: Edinburgh, 1797. 8°.

Br. Mus. Cat.

Commercium philosophico-technicum; or the philosophical commerce of arts. London, 1763[–65]. 4°.

Br. Mus. Cat.

Herrn W. L....Historie der Farben. Aus dem Englischen uebersetzt von Johann Heinrich Ziegler. [A translation of pt. 6 of W. L.'s Commercium philosophico-technicum.] Zuerich, 1766. 8 vo.

Bolton, Select. Bibl. of Chem., Part III.

Br. Mus. Cat.

Expériences physiques et chimiques sur pleisieurs matières relatives an commerce et aux arts; ouvrage traduit de l'Anglais.....par M. de Puisieux. 3 tom. Paris, 1768. 12°.

Br. Mus. Cat.

Historie des Goldes und der Gewerbe so davon abhangen. Zuerich, 1764.

A second edition bears the title:

Geschichte des Goldes und verschiedene damit sich beschaeftigende Kuenste und Arbeiten. Graetz, *n.d.* (1780), pp. (VI)–325. 4 folding plates.

The title is misleading as the work is not a history but a treatise on the metallurgy and technology of gold. Lewis was F.R.S.

Bolton, Select Bibliography, Part V.

Experiments and Observations on American Potashes. With an Easy Method of Determining Their Respective Qualities. By W. Lewis, M.B., F.R.S. Made at the request of the Society for the Encouragement of Arts, Manufactures and Commerce, in consequence of an application from the House of Representatives of Massachusetts Bay. London: Printed by Order of the Society. MDCCLXVII. Brochure, 8 vo., pp. 34.

Libr. Univ. Wisc.

Cat. Surg. Gen. Libr.: 34 pp. 8°. London, 1767. (P., v. 749.)

Br. Mus. Cat.

Hoffmann (Friedrich) of Halle, the Younger.

A system of the Practice of Medicine; from the Latin ("Medicina rationalis systematica") of Dr. Hoffmann.....By W. Lewis.....Revised and completed by A. Duncan. 2 vol. J. Murray: London, 1783, 8°.

Br. Mus. Cat.

Front, interior view of Lascoff Pharmacy.

WELLCOME MEDAL TO COLONEL SKINNER.

The Henry S. Wellcome medal and a prize of $500 have this year been awarded to Col. George A. Skinner, Medical Corps, U. S. Army, Chief Surgeon, Seventh Corps Area, Omaha, Neb., for his essay, "The Influence of Epidemic Disease on Military Operations in the Western Hemisphere." The presentation will be made during the meeting of the Association of Military Surgeons of the U. S., at New Orleans, in November.

A STUDY OF THE EMODIN-BEARING GROUP OF CATHARTICS. AROMATIC FLUIDEXTRACT OF CASCARA. PART II.

BY PETER VALAER, JR.

The purpose of this article is to show the composition of U. S. P. Aromatic Fluidextract of Cascara and to apply the usual methods of analysis which were outlined in detail in Part I[1] of this series of articles.

Although the same amount of ground cascara is used in its manufacture, the color readings of this preparation are much less than were obtained on regular U. S. P. Fluidextract of Cascara. This pleasant form of cascara is very extensively used; probably it is the most popular of all of the preparations of the emodin-bearing group. From the fact that 1000 Gm. of this cascara are used in the manufacture of this preparation, the same as are used for ordinary Fluidextract of Cascara, and the dosage is given as 30 minims, while the regular Fluidextract of Cascara is only 15 minims, it would seem that the cathartic value is considered only about one-half as strong in the aromatic cascara as in the ordinary Fluidextract of Cascara. One thing is quite certain, that the aromatic preparation is much more palatable.

The U. S. P. VII (1890), does not list the Aromatic Fluidextract of Cascara. In the U. S. P. VIII, Cascara Aromatic first appears and differs from the regular Fluidextract of Cascara in that 1000 Gm. of the drug are mixed with 1000 Gm. of ground glycyrrhiza of No. 30 powder and 125 Gm. of magnesium oxide. With this are added glycerin and compound spirit of orange. The U. S. P. IX requires the same amount of ground bark and the same amount of magnesium oxide as U. S. P. VIII, but an extract of licorice is used and a larger assortment of flavoring oils. The U. S. P. X specifies 1000 Gm. of the dry bark but with 60 Gm. of magnesium oxide and 60 Gm. of lime. There is obviously some important change due to the lime because when some of the same batch of ground bark is made into U. S. P. Fluidextract Cascara Aromatic U. S. P. IX, and another portion into U. S. P. Aromatic X, there is a much darker red color produced in the drug mass before percolation when lime is used. Evidently a substantial amount of the emodin or its derivatives is being released or destroyed by this treatment. It may be that the action of the base $Ca(OH)_2$ reacts with emodin or frangulic acid, forming the calcium salt which is insoluble in water, thus removing most of the free emodin.

In this study there will appear the analyses of numerous fluidextracts consisting of old Fluidextract Aromatic Cascara U. S. P., which has been in this laboratory for several years, securely stoppered, and Fluidextract Aromatic Cascara U. S. P., of less age, and some recently manufactured cascara furnished directly from several large drug houses, which was furnished by them from their research department; also some very recently purchased fluidextracts from wholesale drug houses, and of several Aromatic Fluidextracts of Cascara which have been manufactured in this laboratory. These aromatic cascaras manufactured here are from batches of bark which have also been used to make the straight Fluidextract of Cascara; also Fluidextract Aromatic Cascara made by U. S. P. IX, and U. S. P. X, for the purpose

[1] Part I, JOUR. A. PH. A., 19 (1930), 235–238.

of determining just what analytical differences there are between the different preparations.

Out of this data it is hoped we may outline specifications as to just how a preparation containing the different quantities of Fluidextract of Cascara Aromatic must run. Each of these fluidextracts mentioned above has been made into preparations containing from 20% to 25% alcohol and containing in each fluid-ounce exactly 30 minims of this Aromatic Cascara. A search of the literature has not furnished a very definite reason why the Fluidextract of Cascara Aromatic is considered only one-half the strength of bitter Fluidextract of Cascara and it is hoped that the following determinations will throw some light upon this problem. It would seem that there is some uncertainty in the minds of those responsible for the addition of magnesium oxide and calcium oxide as to just what its function is and why it is necessary to add lime in the U. S. P. X in addition to the magnesium oxide.

It was shown by E. O. Eaton (1), that the process of making Aromatic Cascara did not entirely destroy the reaction from emodin but in some cases it would be necessary to boil the preparation in acid so as to produce the test. In all of the Fluidextract of Cascara Aromatic that has ever been tested in this laboratory there has been a large reduction in free emodin over what we might expect from the amount of cascara used in its manufacture. In some instances, however, all of the free emodin is not destroyed or rendered inactive but in most instances it has been very materially reduced. The amount of the combined emodin is also greatly effected particularly by the use of lime. F. W. Nitardy (2) says:

> "It is known that the use of magnesium oxide as a de-bittering agent in the manufacture of Aromatic Fluid Extract of Cascara reduces the activity of this preparation to a considerable extent."

In the same publication Mr. Nitardy offers some theories as to just what has happened. Milford Harris and Edward D. Davy (3) state:

> "Aromatic Fluidextract of Cascara is less active than the Fluidextract because of the formation of a water-insoluble compound of the active agent, presumably the glucoside."

According to Warren (4), it was the late Prof. W. M. Searby of San Francisco and former president of the AMERICAN PHARMACEUTICAL ASSOCIATION, who was the first to introduce cascara debitterized with magnesium. Possibly the treatment removes free emodin. He also states that besides lime and magnesium oxide that zinc oxide had been used.

In the first table there are 35 fluidextracts. All of the same manufacturer are brought together in small groups for ease of comparison. All were alleged to be U. S. P. or its equivalent, although 15, 16, 17 and 36 had already been declared by the analyst to be substandard, and to these may be properly added at least three others of low readings.

In this table will be found the alcohol, solids, ash, calcium and magnesium oxide content all determined by the A. O. A. C. methods, and the colorimetric emodin readings determined as follows:

Method for Color Reading—before Hydrolysis (Free Emodin).—Extract 25 cc. of the preparation, made acid with 2 cc. $N/10$ H_2SO_4, extract by continuous shaking 5 minutes with 50 cc. of ordinary sulphuric ether in a separatory funnel; draw off aqueous liquor several times as it settles and

take 10 cc. of the yellow ether extract and 10 cc. of strong ammonia and place in a colorimetric tube (Nessler), mix, allow to stand until some of the remainder of the yellow ether extract is read in $^1/_{16}$-inch cell, then make the mixture in the Nessler tube up to 50 cc. volume with water. Flick off the ether which rises to the top and read the red color in a $^1/_8$-inch cell.

Method for Color Reading—after Hydrolysis (Total Emodin).—The cascara preparation contained in each fluidounce 15 minims of fluidextract and 30 minims per fluidounce of Aromatic Cascara; 25 cc. of each preparation was treated in an Erlenmeyer flask with 2 cc. of concentrated sulphuric acid, shaken thoroughly and allowed to stand over night; reflux over a steam-bath for 30 minutes using a tube condenser. Transfer the material into a separatory funnel. Shake with 50 cc. of ordinary ether for exactly 5 minutes, allow to settle; draw off aqueous layer, shake and again allow to settle. Again draw off the remaining aqueous material. Repeat this process until all the aqueous liquor is stripped out as completely as possible.

Take 10 cc. of the yellow ether extract and 10 cc. of strong ammonia and place in a colorimetric tube (Nessler), mix, allow to stand until some of the remainder of the yellow color is read in $^1/_{16}$-inch cell, then make the mixture in the Nessler tube up to 50 cc. volume with water, allow to settle, flick off the ether which rises to the top and read the red color in $^1/_8$-inch cell.

TABLE I.—FLUIDEXTRACT OF CASCARA SAGRADA AROMATIC.
Samples Made up 30 Minims per Fluidounce except Where Indicated.

Laboratory no.	Per cent alcohol by volume.	Solids.	Grams per 100 cc. of Ash.	Grams per 100 cc. of CaO.	MgO.	Before Hydrolysis. Yellow eth. ext. $^1/_{16}$" cell.	Before Hydrolysis. Red alkaline sol. $^1/_8$" cell.	After Hydrolysis. Yellow eth. ext. $^1/_{16}$" cell.	After Hydrolysis. Red alkaline sol. $^1/_8$" cell.
15 (97705)	24.41	2.79	0.260	0.0594	0.0660	0.6	0.4 R 0.3 Y	1.6	0.6 R 0.6 Y
16 (97706)	24.43	2.66	0.256	0.0358	0.0739	0.6	0.4 R 0.3 Y	1.6	0.6 R 0.6 Y
17 (97707)	24.40	2.68	0.230	0.0426	0.0327	0.5	0.3 R 0.2 Y	1.5	0.5 R 0.5 Y
18 (98384) Del. (Burrough)	24.78	3.06	0.120	0.0596	0.0356	2.2	1.6 R 0.6 Y	7.0	3.5 R 1.5 Y
28 (99250) 304411130	25.56	3.53	0.382	0.0448	0.0650	1.00	0.5 R 0.3 Y	3.4	1.7 R 1.3 Y
36 Purchased from Gilman 306630	25.11	2.36	0.208	0.0412	0.0775	0.6	0.2 R 0.1 Y	1.5	0.7 R 0.7 Y
33 Made in lab. Burrough Bark, U. S. P. IX	25.6	3.3	0.175	0.0252	0.0859	1.5	1.2 R 0.3 Y	11.5	5.5 R 2.8 Y
34 ditto except U. S. P. X	25.18	3.46	0.27	0.1330	0.0422	0.9	0.7 R 0.4 Y	5.6	3.7 R 2.4 Y
37 Straight fluidextract 15 min. per fluidoz.	25.79	0.91	0.02	0.0056	0.0088	1.5	1.15 R 0.4 Y	5.6	3.7 R 2.2 Y
1 75024		2.40	0.26	0.1444	0.1353	1.6	0.4 R 0.3 Y	4.4	1.5 R 2.0 Y
2–FO 7486	24.56	2.83	0.33	0.1812	0.1347	0.9	0.2 R 0.3 Y	3.0	1.7 R 1.1 Y
12–9G 4057	24.67	3.24	0.23	0.1436	0.0714	1.3	0.6 R 0.4 Y	4.2	2.2 R 1.9 Y
29 OK 2677	24.12	3.66	0.19	0.1072	0.0601	1.1	0.5 R 0.4 Y	4.6	2.4 R 2.5 Y
30 OG 1364	24.92	3.59	0.18	0.0647	0.0980	1.6	0.5 R 0.4 Y	4.2	2.1 R 2.5 Y
39 OE 5959	24.93	3.97	0.40	0.0748	0.1182	1.7	0.7 R 0.6 Y	3.2	2.0 R 2.2 Y
7 02066X832806		1.73	0.24	0.0595	0.1061	0.7	0.2 R 0.3 Y	3.0	1.6 R 2.7 Y

13 72509–645692		2.04	0.14	0.0692	0.0468	0.6	0.4 R 0.3 Y	2.2	1.6 R 1.7 Y
19 7076 845514	24.60	1.82	0.216	0.1442	0.0470	0.7	0.3 R 0.4 Y	3.5	1.7 R 2.2 Y
20 7102 848105	23.56	2.02	0.200	0.1338	0.0635	0.8	0.3 R 0.4 Y	3.6	2.2 R 2.4 Y
27 4085 837269	25.28	3.15	0.209	0.1039	0.0576	1.0	0.3 R 0.3 Y	4.6	2.8 R 3.3 Y
3 4010AD–41932		3.02	0.17	0.0240	0.0842	0.6	0.2 R 0.3 Y	3.1	1.6 R 2.7 Y
4 4010AD–41932	24.68	3.04	0.14	0.0171	0.0516	0.6	0.2 R 0.3 Y	2.8	1.6 R 2.6 Y
9–3505 GM–31585		3.22	0.148	0.0549	0.0801	0.8	0.4 R 0.3 Y	3.6	1.8 R 1.9 Y
10 4110 LK 39748	25.26	2.83	0.150	0.0114	0.0802	0.8	0.5 R 0.3 Y	6.0	3.6 R 2.0 Y
23 44D7LB 48502	24.52	2.84	0.156	0.0174	0.0631	0.7	0.3 R 0.3 Y	3.5	2.8 R 2.6 Y
38 1170784	24.86	3.03	0.286	0.0160	0.0613	0.2	0.1 R	1.7	1.0 R 1.6 Y
25 78261 (Na_2HCO_3)	24.80	2.19	0.130	0.0036	0.0098	1.9	1.0 R 0.3 Y	4.4	2.7 R 1.3 Y
5 2812566		1.62	0.09	0.0070	0.0403	0.5	0.0	1.4	0.7 R 1.0 Y
11 2450117		1.81	0.09	0.0314	0.0320	0.6	0.3 R 0.3 Y	3.4	2.1 R 0.8 Y
22–2919654	24.84	1.70	0.116	0.0076	0.0562	0.5	No R	2.0	1.2 R 1.5 Y
8 571486A	24.44	1.61	0.14	0.0756	0.0803	0.6	0.2 R 0.1 Y	2.5	1.2 R 1.0 Y
14–11183878	25.11	2.86	0.213	0.1221	0.0442	0.6	0.4 R 0.3 Y	3.4	1.9 R 1.5 Y
21–A 631949	24.80	2.956	0.236	0.0938	0.0216	0.7	0.4 R 0.3 Y	3.7	2.2 R 2.0 Y
24–En. & G. BBrk, IX	25.40	3.186	0.180	0.0216	0.0846	1.6	1.0 R 0.3 Y	12.5	5.5 R 3.2 Y
31–En. & G. Bark, X	24.76	3.30	0.23	0.1380	0.0331	0.9	0.52 R 0.4 Y	6.4	3.9 R 3.0 Y
32–En. & G. Bark (15 min.), X St. F. E.	25.60	0.80	0.025	0.0031	0.0080	2.4	1.2 R 0.3 Y	7.0	4.0 R 1.8 Y
33–Burrough Bark, IX	25.6	3.3	0.175	0.0252	0.0859	1.5	1.15 R 0.3 Y	11.5	5.5 R 2.8 Y
34–Burrough Bark, X	25.18	3.46	0.27	0.1330	0.0422	0.9	0.7 R 0.4 Y	5.6	3.7 R 2.4 Y
37 Burrough Bark (15 min.), X St. F. E.	25.79	0.91	0.020	0.0056	0.0088	1.5	1.15 R 0.4 Y	5.6	3.7 R 2.2 Y
43 Aromatics only		0.869	0.034	0.00067	0.00329	Neg.	Neg.	Neg.	Neg.
26 (85969)	25.92	3.734	0.200	0.0795	0.0790	0.9	0.3 R	2.6	1.2 R 1.4 Y
35 (266409)	25.10	3.03	0.280	0.1352	0.0209	0.9	0.5 R 0.3 Y	4.8	2.4 R 2.0 Y

There were also made determinations of all the preparations listed in the first table by a method suggested by H. C. Fuller (5) for the assay of cascara and submitted by him at one time to the A. O. A. C. The method is as follows:

Introduce 5 Gm. of the powdered drug or 5 cc. of the fluidextract or 25 cc. of a tonic containing as medication, Fluidextract of Cascara or Fluidextract of Aromatic Cascara into an Erlenmeyer flask of 500 cc. capacity; add 200 cc. of chloroform and 50 cc. of 25% sulphuric acid (70 cc. of sulphuric acid in water q. s. 500 cc.); attach to a reflux condenser (water cooled) using cork stopper covered with tin foil. Apply low heat of Bunsen flame and allow the chloroform to boil for two and one-half hours. At the end of that time allow to cool and then transfer to separatory funnel, washing out flask with a little fresh chloroform.

Draw off the chloroform into another separatory funnel. Add 50 cc. chloroform to the acid mixture, agitate and after separation has taken place, run chloroform into that previously collected. Repeat the procedure three times for bark and fluidextract and twice for preparations. Discard the acid mixture.

Collect the chloroform shake-outs in an Erlenmeyer or distilling flask, recover about $^2/_3$ of the solvent by distillation and pour the balance into a separatory funnel, washing thoroughly to remove final traces of anthraquinones; (use foil on all stoppers when recovering chloroform during distillation) agitate the chloroform with 25 cc. of 10% sodium hydroxide; draw off chloroform and subject to another treatment with 10% sodium hydroxide. Repeat again; draw off chloroform and wash with 25 cc. of water three times. (Two washings are sufficient with preparations containing one or two doses of cascara.)

Unite the alkaline solutions and washings, add excess of hydrochloric acid (15 cc. of conc. HCl is usually sufficient) and shake out five times with chloroform. (Three times are sufficient with tonic preparations.) Discard the acid and wash the chloroform solution by shaking with 50 cc. of water; repeat, washing with 50 cc. of water; let settle completely, filter chloroform through cotton in stem of funnel into a distilling flask or Erlenmeyer flask and recover a portion of the solvent. Then pour the balance into a weighing dish, washing out distilling flask with chloroform; evaporate the solvent and dry at not over 100 degrees centigrade for 30 minutes, cool in desiccator and weigh. The weight represents the total anthraquinone bodies in the drug. Preserve the residue for the method described below. (If the residue should show any visible trace of white crystalline material wash again with water.)

COLORIMETRIC DETERMINATION.

Treat the residue of anthraquinone derivative obtained by the gravimetric assay described above with 10 cc. of 10% potassium hydroxide, wash into a 100-cc. graduated flask with distilled water and make up to volume. Ten cc. of this solution is then diluted with water to 50 cc., a portion introduced into a one-eighth-inch cell of a Lovibond tintometer and matched against the red slides. Note depth of color and report degrees observed.

Transfer 20 cc. of the alkaline liquid by means of pipette to a separatory funnel, add an excess of hydrochloric acid and extract with 25- and 15-cc. portions of ether. Collect the ether solution in a 50-cc. graduated flask and make up to volume with ether. Introduce a portion of this ether solution into a $^1/_{16}$-inch cell of a Lovibond tintometer; match against the yellow slides; note depth of color and report degrees observed.

TABLE II.—TOTAL EMODIN DETERMINED BY THE EXTRACTION METHODS.

(Proposed A. O. A. C. Cascara Assay.)

No.	Substance.	25 cc. Used of a Preparation Containing 30 ℔ to Oz. of Aromatic Fluidextract Cascara. Wt. of residue.	Emodin Reading. Yellow $^1/_{16}$" cell.	Red $^1/_8$" cell.
1	Flext. Cascara Aromatic 30 ℔ to oz.	0.024	0.6	0.4 R
2	" " " " " " "	0.028	0.5	0.4 R
3	" " " " " " "	0.040	0.5	0.5 R 0.3 Y
4	" " " " " " "	0.040	0.6	0.8 R 0.3 Y
5	" " " " " " "	0.024	0.8	0.7 R 0.4 Y
6	" " " " " " "	0.022	0.6	0.6 R 0.5 Y

7	"	"	"	"	"	"	"	0.022	0.8	0.6 Y 0.5 R
8	"	"	"	"	"	"	"	0.019	0.4	0.4 R 0.3 Y
9	"	"	"	"	"	"	"	0.027	0.5	0.8 R 0.4 Y
10	"	"	"	"	"	"	"	0.028	0.8	0.9 R 0.4 Y
11	"	"	"	"	"	"	"	0.014	0.6	0.6 R 0.3 Y
12	"	"	"	"	"	"	"	0.032	0.8	0.9 R 0.4 Y
13	"	"	"	"	"	"	"	0.014	0.4	0.2 R
14	"	"	"	"	"	"	"	0.021	0.4	0.2 R
15	"	"	"	"	"	"	"	0.025	0.1	0.1 R
16	"	"	"	"	"	"	"	0.017	0.2	0.2 R
17	"	"	"	"	"	"	"	0.009	0.2	0.12 R
18	"	"	"	"	"	"	"	0.0185	1.10	1.2 R 0.2 Y
19	"	"	"	"	"	"	"	0.024	0.6	0.52 R 0.2 Y
20	"	"	"	"	"	"	"	0.026	0.6	0.68 R 0.3 Y
21	"	"	"	"	"	"	"	0.014	0.3	0.4 R 0.2 Y
22	"	"	"	"	"	"	"	0.0121	0.40	0.28 R
23	"	"	"	"	"	"	"	0.0235	0.70	0.52 R 0.30 Y
25	"	"	"	"	"	"	"	0.0210	0.60	0.42 R 0.20 Y
26	"	"	"	"	"	"	"	0.0190	0.30	0.20 R
27	"	"	"	"	"	"	"	0.0350	1.3	1.20 R 0.10 Y
28	"	"	"	"	"	"	"	0.0228	0.40	0.40 R
29	"	"	"	"	"	"	"	0.0285	0.40	0.40 R
30	"	"	"	"	"	"	"	0.0283	0.40	0.40 R
35	"	"	"	"	"	"	"	0.0130	0.50	0.40 R
36	"	"	"	"	"	"	"	0.0035	0.20	0.10 R
38	"	"	"	"	"	"	"	0.0085	0.40	0.40 R
39	"	"	"	"	"	"	"	0.0140	0.40	0.40 R

TABLE II.—*Continued.*

TOTAL EMODIN DETERMINATION BY THE EXTRACTION METHOD.

(Proposed A. O. A. C. Cascara Assay.)

Five Grams Bark or 5 cc. of Fluidextract or 25 cc. of a Preparation.

No.	Substance.	A. O. A. C. wt. residue.	Emodin Reading. Yellow 1/10" cell.	Red 1/8" cell.	Description and source of material.
24	Aromatic Flext. Cascara U. S. P. IX	0.1090	3.2	4.7 R 1.0 Y	Made in lab. from Engelhardt and G.-L. Co. Mixed bark, over 4-year old bark
31	Aromatic Flext. Cascara U. S. P. X	0.1125	2.5	3.7 R 0.9 Y	"
32	U. S. P. Flext. Cascara	0.0757	4.4	5.4 R 1.0 Y	"

33	Aromatic Flext. Cascara U. S. P. IX	0.1074	4.0	4.0 R 1.2 Y	Made in lab. from Burrough Bros. bark over 4 years old
34	Aromatic Flext. Cascara U. S. P. X	0.1221	2.8	3.5 R 1.0 Y	"
37	U. S. P. Flext. Cascara	0.0920	4.8	5.0 R 1.6 Y	"
24	Preparation (30 ℥ per oz.)	0.0415	1.1	1.0 R 0.2 Y	Made from Arom. Flext., No. 24—Engelhardt and G.-L. bark, U. S. P. IX
31	"	0.0555	1.0	1.0 R 0.4 Y	Same as above except U. S. P. X
33	"	0.0605	1.5	1.0 R 0.3 Y	Made from Arom. Flext., No. 33, Burrough Bros. bark, U. S. P. IX
34	"	0.0785	1.0	0.8 R 0.4 Y	Same as above except U. S. P. X
32	Preparation (15 ℥ per oz.)	0.0330	1.4	1.0 R 0.4 Y	Made from the straight U. S. P. Flext. from Engelhardt and G.-L. bark
37	"	0.0285	1.0	0.8 R 0.4 Y	Same as above except from Burrough Bros. bark
41	Burrough bark alone. Five grams used	0.2365	6.0 (0.2 R)	5.7 R 2.7 Y	Original Burrough Bros. bark from which standard above Flexts. were made
42	Engelhardt and G.-L. bark alone. Five grams used	0.2160	5.2 (0.2 R)	5.2 R 1.4 Y	Original Engelhardt and G.-L. bark from which standard Flexts. were made
43	Aromatics as in mfg. of Flext. Arom. Cascara	0.0250	Neg.	Neg.	Prepared to see what effect if any the aromatics alone would produce without Cascara (5 cc. of Flext. minus bark)

EMODIN LOSS DUE TO ALKALI.

A special experiment was conducted with two batches of ground cascara bark.

(A) Furnished by late Dr. Engelhardt, mixed with some purchased from Gilpin-Langdon & Co. These two sets of bark were thoroughly mixed and 3 following preparations were made.

(24) Aromatic Fluidextract of Cascara Aromatic U. S. P. IX.

(31) Aromatic Fluidextract of Cascara Aromatic U. S. P. X.

(32) Straight Fluidextract of Cascara U. S. P. X.

(B) Cascara bark furnished by Burrough Bros., Baltimore, Md. This ground cascara bark was carefully mixed and the following preparations were made from it.

(33) Aromatic Fluidextract Cascara Aromatic U. S. P. IX.

(34) Aromatic Fluidextract Cascara Aromatic U. S. P. X.

(37) Straight Fluidextract of Cascara U. S. P. X.

The usual extractions and color readings were made on preparations made from these fluidextracts. The aromatic fluidextracts were made into preparations containing in each fluidounce 30 minims and the straight fluidextract, into preparations containing 15 minims per fluidounce (25 cc. used for analysis).

	Free Emodin.		Total Emodin.	
Engelhardt and Gilpin-L. & Co.	Yellow 1/16" cell.	Red 1/8" cell.	Yellow 1/16" cell.	Red 1/8 cell.
No. 24 Aromatic U. S. P. IX		1.0 R		5.5 R
30 ♏ to fluidounce	1.6	0.3 Y	12.5	3.2 Y
No. 31 Aromatic U. S. P. X		0.52 R		3.9 R
30 ♏ to fluidounce	0 9	0.44 Y	6.4	3.0 Y
No. 32 Straight (15 ♏ to	2.4	1.20 R		4.0 R
fluidounce		0.30 Y	7.0	1.8 Y
No. 33 Burrough bark 30 ♏ to		1.15 R		5.5 R
Aromatic U. S. P. IX (fluidounce)	1.15	0.30 Y	11.5	2.8 Y
No. 34 Aromatic U. S. P. X	0.9	0.7 R		3.7 R
30 ♏ to fluidounce		0.44 Y	5.6	2.4 Y
No. 37 Straight	1.5	1.15 R		3.7 R
15 ♏ to fluidounce		0.44 Y	5.6	2.2 Y

The above table shows that 4-year old bark is same as 2-year old and it shows U. S. P. IX Aromatic 50% better color readings than U. S. P. X aromatic.

It shows use of MgO only, reduces free emodin 50% and reduces combined emodin 14.7% and total emodin 25.7%; shows use of MgO plus CaO, reduces free emodin 70% and reduces combined emodin 41% and total emodin 50%.

Above according to red readings only on Burrough bark.

Engelhardt and Gilpin & Langdon (4-year bark)

Shows use of MgO only, reduces free emodin 58% and reduces combined emodin 20.0% and total emodin 31%.

Shows use of MgO plus CaO, reduces free emodin 78% and reduces combined emodin 40.0% and total emodin 51.2%.

AMOUNT OF REDUCTION OF EMODINS OF THE 2 BARKS.

	Engelhardt and Gilpin-Langdon Co.		Burrough.	
Reduction.	MgO.	MgO plus CaO.	MgO.	MgO plus CaO
Free	58.0%	78.0%	50.0%	70.0%
Combined	20.0%	40.0%	14.7%	41.0%
Total	31.0%	51.2%	25.7%	50.0%

From the above it would seem that the more alkaline lime causes a severe change on the color reading of cascara, about twice the effect of magnesium. It is likely that it also follows that the laxative action is also reduced in proportion.

It may be shown that lime is not only unnecessary for debitterizing purposes but very detrimental to the product. Lime yields a product which has a different taste from that in which magnesium alone is used, and it is not as palatable.

It would seem to those working in this laboratory on this problem that lime in the manufacture of Fluidextract Cascara Aromatic has only one virtue, that of cheapness.

COLOR READINGS OF BARK EQUIVALENT.

It seemed desirable to run the colorimetric emodin analysis both before and after hydrolysis on the equivalent weight of ground bark which corresponded to the fluidextract on a preparation containing 15 minims of the fluidextract per fluidounce of preparation and using 25 cc. of such preparation for the analysis.

Accordingly 0.822 Gm. of Burrough bark and the same weight of the mixed G.-L. & Co. and Engelhardt barks were used; 0.822 Gm. of bark placed in a separatory funnel, 25 cc. distilled H_2O and 2 cc. N/H_2SO_4 added, then 50 cc. ether and whole shaken for 5 minutes for the free emodin analysis. 0.822 Gm. of bark placed in a 250-cc. Erlenmeyer flask, 25 cc. distilled H_2O and 2 cc. concentrated H_2SO_4 added and allowed to stand over night; then refluxed with air condenser on steam-bath for $^1/_2$ hour; cooled, placed in separatory funnel, 50 cc. ether added and whole shaken for 5 minutes for total emodin analysis.

Sample.	Free Emodin. Yellow $^1/_{16}$" cell.	Red $^1/_8$" cell.	Total Emodin. Yellow $^1/_{16}$" cell.	Red $^1/_8$" cell.
Burrough Bros.	3.5	1.9 R	6.8	3.7 R
Bark		0.7 Y		1.5 Y
G.-L. & Co. and	3.3	1.75 R	6.8	3.24 R
Engelhardt bark		0.50 Y		1.10 Y

CONCLUSIONS.

Between the colorimetric and gravimetric methods outlined above the first is simpler and more reliable and the determinations listed in Table I are all that are necessary to determine the amount of aromatic cascara in a preparation or the strength of a U. S. P. Aromatic Cascara or one that is claimed to be equivalent thereto.

The second method, results shown in Table II and called for convenience the "Proposed A. O. A. C. assay," can also be used in addition to the determinations made and listed in Table I, but it is more involved and requires more time. In this method using a weaker acid concentration for digestion failed to improve the result. Responsible persons may secure the names of the manufacturers of these products by addressing the author, Room 422, Treasury Building.

A great deal of the above analytical work was done by Geo. E. Mallory, W. H. Frazier and Loren Burritt.

REFERENCES.

(1) E. O. Eaton, JOUR. A. PH. A., 11 (1922), 21.
(2) F. W. Nitardy, *Ibid.*, 12 (1923), 495.
(3) Harris and Davy, *Ibid.*, 19 (1930), 28.
(4) Warren, *Ibid.*, 13 (1924), 256.
(5) Fuller, *J. Assoc. Official Agr. Chem.*, 5 (1922), 577; 7 (1920).

PERMIT PROCEDURE RELATING TO INDUSTRIAL ALCOHOL AND OTHER NON-BEVERAGE LIQUORS.

Commissioner James M. Doran has issued a publication on above, which should be obtained by those interested and to the latter belong more than 177,000 individuals.

In the consideration of an application for a permit Bureau officers, by careful inspection and investigation, seek to establish definitely these four important points:

1. Fitness of the applicant and others connected with the enterprise to carry on the business for which permit is requested;

2. Sufficiency of bond and integrity of all individuals connected with the financing of the project or those who intend to manage and operate the business;

3. Premises, plant, buildings and apparatus to be used are in accord with regulations and are suitable for the business;

4. Adequacy of evidence offered by applicant as to the legitimate disposition of the product and the standing of those who, it may be claimed, will purchase the finished product.

Permit control procedure includes active supervision over business operations by Government officers, regular examination and audit of accounts and records, and other pre-cautionary checks to insure lawful compliance with permit conditions.

THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

C. B. JORDAN—CHAIRMAN OF EXECUTIVE COMMITTEE, A. A. C. P., EDITOR OF THIS DEPARTMENT.

THE EDUCATIONAL MOVEMENT IN PHARMACY.

BY HENRY C. BIDDLE.*

The following address by Dean Henry C. Biddle of the College of Pharmacy, University California, appeared in a recent issue of the *American Pharmacist*. I believe it is worthy of greater distribution and I am therefore using it in this Section. I wish to commend it to the attention of all pharmaceutical educators.—C. B. JORDAN, *Editor*.

There are two issues whose attempted solution is the subject of unending discussion—one is the economic situation, the other the educational. In neither case has a perfect solution, or even a "best method" ever been evolved, nor is such anticipated. In each case what is sought is a more efficient method of procedure. This is particularly noteworthy in studying the advance in pharmaceutical education during the last few years.

In 1925 a three-year curriculum took the place of the earlier training of two years, and in 1932 the four-year curriculum becomes the minimum requirement of the American Association of Colleges of Pharmacy.

Many of the Schools of Pharmacy have already anticipated the forward movement, and to-day more than seventy-five per cent of the State Colleges are offering a four-year curriculum in Pharmacy, either as a minimum requirement, or in conjunction with the three-year program.

FIXING AN EDUCATIONAL POLICY.

In studying the curricula presented by different institutions, it soon became apparent to the national association that these curricula lacked that definition in educational policy which would be acceptable in academic circles. As a certain educator is reported to have stated: "You pharmacists don't appear to know what you want educationally. Find this out and we shall be glad to coöperate with you."

In view of the existing confusion in this matter, the American Association of Colleges of Pharmacy in session at Rapid City, South Dakota, in August 1929, appointed a committee of five deans—of whom the speaker had the honor to be one—to study the situation, and, as the results of this study, to present before the national convention to be held in Baltimore, Maryland, in May 1930, an acceptable educational program. The task before the committee was not a simple one, since it involved not alone the formulating of a general educational policy, but also the harmonizing of interests of quite divergent educational points of view. So important were the issues at stake, however, that the association decided to devote an entire session to the consideration of the report.

As a result of the deliberation held in Baltimore, the report of the committee of five was unanimously adopted practically as presented. The educational policy

* Dean of the College of Pharmacy of the University of California.

as set forth thereby became the accepted educational policy of the American Association of Colleges of Pharmacy, or as one has observed, a yardstick for measuring our educational procedure.

Under such circumstances a brief résumé of the outstanding features of the report as adopted merits our attention.

WORK AND OBJECTIVES OF THE COMMITTEE.

As a preliminary point of approach, consideration was given by the committee to the earlier studies of Dr. W. W. Charters and his associates, particularly regarding their ideas as to the activities and duties of a pharmacist. The conclusions of Charters and his co-workers may be summarized under three heads; the professional knowledge of the pharmacist, his general knowledge and the character of the man himself.

(1) "The professional knowledge of the pharmacist," said they, "must include an ability to read, intelligently, the U. S. Pharmacopœia and the N. F., to fill prescriptions accurately, to understand what drugs are to be manufactured and what are to be purchased." This knowledge should include, further, a familiarity with the commercial phases of pharmacy and the federal and state laws governing the profession of pharmacy.

(2) In his general knowledge the pharmacist must have at his command, information regarding the control of insects, fungi, etc.; he should know more about the nature of disease and be able to disseminate information regarding public health; he must be able to give advice, as well as furnish material, in cases of first aid; and in addition to these, because of the very nature of his position, he should possess a wide knowledge covering many matters.

(3) As to his personal qualifications, the pharmacist must be a cultured, intelligent individual, possessing acceptable social qualities and a high professional morale. He should be progressive in continuing after graduation to advance in knowledge and skill, and, in the case of some individuals, may develop research.

Such were the general conclusions reached by Charters and others as to what the pharmacist should know and be.

It has been pointed out on a number of occasions that there are two quite divergent views regarding the objective of pharmaceutical education. One has for consideration the preparation of the so-called practical pharmacist, the other has the wider vision of developing the potential capacities of the individual so that he may be in better position to adjust himself to meet the responsibilities of a pharmacist in many directions.

The committee held that the latter objective is the better, even in the training of the "practical" pharmacist so-called.

The educational policy presented attempts to offer to the student such training that he will later be in a position, not only "to render the community in which he goes to live and practice his profession, intelligent and constructive pharmaceutical service, but will be prepared by his training so to develop and improve himself when he is out of college that he can satisfactorily meet the changing demands that are sure to occur throughout his service." The program thus keeps clearly in mind the needs of the practicing pharmacist, and the question as to what training in four years will best prepare him for his profession.

The "educational policy also includes the preparation of a man, who is inclined to cope with the scientific problems of pharmacy, to begin research in the field of his choice. This means that the undergraduate four-year course prepares him for the graduate college so far as possible. It provides the 'student' with the opportunity for advanced study, by offering him objectives and additional undergraduate courses."

It was not in any way the purpose of the committee to present for consideration an inflexible program. The objective, rather, was the formulation of a flexible educational policy which would emphasize among other matters:

(*a*) The basal and cultural subjects of fundamental significance.

(*b*) The natural sequence (where this sequence was of importance) of these subjects with reference to one another, and with reference to the later courses of scientific, cultural and technical or professional character.

THE EDUCATIONAL POLICY.

The educational policy as adopted by the American Association of Colleges of Pharmacy includes the following outstanding features:

1. "The *curriculum extends* over a period of four full academic years of approximately 36 weeks, with a minimum of five days per week in accordance with recognized academic procedure." Further, not less than 120 units or semester hours will be required for graduation.

2. The policy lays emphasis upon the importance of *study*. "Each hour of recitation requires on the part of the average student two hours of preparation. Three hours of strictly laboratory work are equivalent in value in certain courses to the time required to accomplish one hour of recitation."

3. The entire educational program outlines not only the general training desired in the four-year curriculum, but also the selection of subjects recommended in the high school. This was felt necessary because of the unequal preparation of many students from the lower school.

(*a*) During the first and second years of the four-year curriculum are presented the basal and cultural subjects in which fundamental training should be offered as a foundation for later scientific and professional courses.

(*b*) In the third and fourth years are given the more strictly professional courses in pharmacy, pharmacognosy, pharmacology and related scientific subjects. Certain freedom of election is recommended in these years, as well as in the first two years. This enables the student to place additional emphasis upon those subjects which meet his particular requirements. Thus, the election may take the direction of fuller general culture, larger preparation for general, retail or manufacturing pharmacy, or additional training in scientific and special subjects.

4. The degree to be awarded on the successful completion of the four-year curriculum is that of B.S. in Pharmacy—a degree in accord with the ordinary standards of academic procedure.

Such in brief summary is the general educational policy of the four-year curriculum in pharmacy, as recommended by the Committee of Five, and as

adopted last May in Baltimore by the American Association of Colleges of Pharmacy.

ADVANTAGES OF A FOUR-YEAR CURRICULUM.

Certain questions have been raised as to the need, or even the advisability, of a four-year curriculum in pharmacy. "Is there enough in pharmacy," it is urged, "to warrant an educational program of four years?" Another question: "Is there enough in the average pharmacist to justify expending four years' training in his education?" Each of these questions is misleading, in that one underestimates the possibilities of the profession, the other attempts to cast ignominy upon the man in the profession. Both questions fail to recognize the part that education plays in enabling a man to make the most of his natural abilities.

The latter question, indeed, requires no answer. At the same time it may be of interest to note that in seeking civic leadership, two cities about San Francisco Bay have in the past two years selected a pharmacist to fill the office of mayor. And of these, Berkeley—with its academic and "high brow" reputation—has just recently reëlected to this high office, by a practically unanimous vote, a pharmacist. Verily, there are occasions when pharmacy cometh unto her own!

Many arguments might be advanced in favor of a four-year curriculum. Such advantages might be presented as: the elevation of *professional standing;* the opportunity for *advanced study;* the enlarging of opportunities for *coöperation with the physician;* a more intelligent grasp of problems *affecting the economic* situation; a fuller preparation for *diversified activities,* as retail pharmacy, exclusive prescription pharmacy, wholesale trade, manufacture, federal and state positions, teaching and research.

In a few words, however, may I emphasize one advantage which the longer curriculum affords—a widening horizon for action—a broader vision of life. It is this which enables a man to employ his talents most advantageously in the field of achievement and it is this broader vision as one element which education makes possible.

A number of years ago a pharmacist in a large city found himself in competition with certain chain stores. As an independent pharmacist the outlook appeared almost hopeless. Instead of becoming discouraged, however, he said: "What the other fellow is able to do, I can do." He made a thorough study of the economic situation, his training making this possible. To-day he is the head of a unique and successful chain of pharmacies.

In August of 1929 a number of us, on our way to attend the national convention at Rapid City, South Dakota, visited a pharmacist in Denver, Colorado, who had caught a vision of coöperation with the physicians of that metropolis. This man, through his scientific training, has built for himself a patronage and a reputation which place him as one of the representative citizens in that city.

At the beginning of the War certain individuals predicted that Germany, because of her control of inexhaustible deposits of potassium salts, would be invincible. Nobody at that time knew how, economically, to extract such salts from the brine of inland salt lakes. Then arose a chemist with a vision, and from his studies was developed a successful process for the extraction of potassium salts from brine. During the War, and since the War, hundreds of tons of these

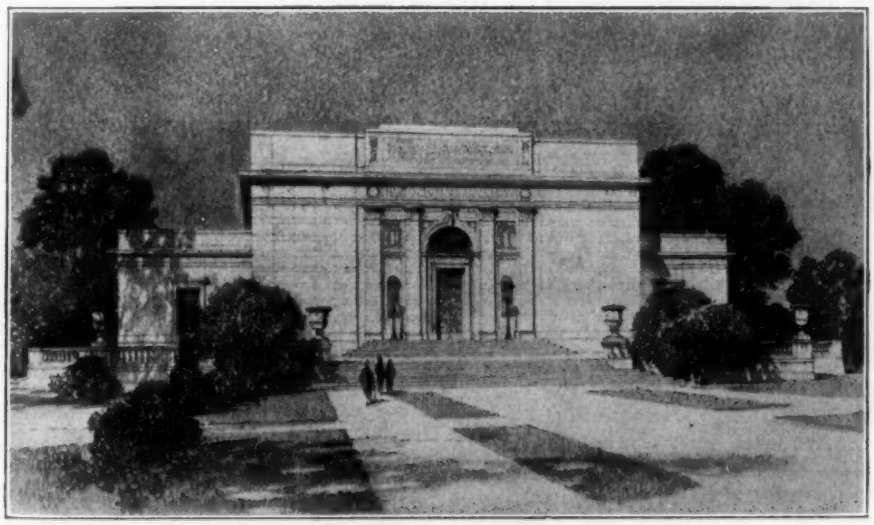
salts have been obtained per day from the brine of Searles Lake in California at a cost below that of the production in Germany. In 1927 this chemist, Dr. John E. Teeple, received the Perkin Medal, awarded for notable achievement in science.

Every pharmacist markets milk of magnesia. Some three years ago a California pharmacist, with training and vision, saw the possibility of preparing this product from the waters of San Francisco Bay. Last December in one month he sold and shipped three carloads of milk of magnesia of the highest quality, all prepared in his manufacturing plant from the salt water of San Francisco Bay.

It was the teaching of the late Russell H. Conwell, the eminent lecturer and founder of Temple University, that the world presents in opportunity "Acres of Diamonds" for the man of thought and vision. This should be one of the educational outlooks of the pharmacist.

THE HEADQUARTERS BUILDING.

THE November issue of the *National Geographic Magazine* is devoted to "Washington through the Year. Our Colorful City of Magnificent Distances" as a feature of the Bicentennial of the Birth of the Father of our Country. Although as stated, "it has been both an interesting and difficult task to represent the composite picture of the National City of mellow yesterday and majestic to-day within 100 pages, when to mirror all of Washington's countless facets, would overflow a



Architect's Sketch, American Institute of Pharmacy, Washington, D. C.

volume of a thousand pages," this number gives a splendid idea of the capital which will soon match in beauty and grandeur that of any nation on earth—and in which each American citizen may take personal pride.

Of special interest to pharmacists is the following quotation from this number:

"Along Sixteenth and Seventeenth Streets, in late years, have risen many palatial buildings of monumental type, semi-public in character, such as the Scottish Rite Temple, the National Geographic Society Group, the National Education

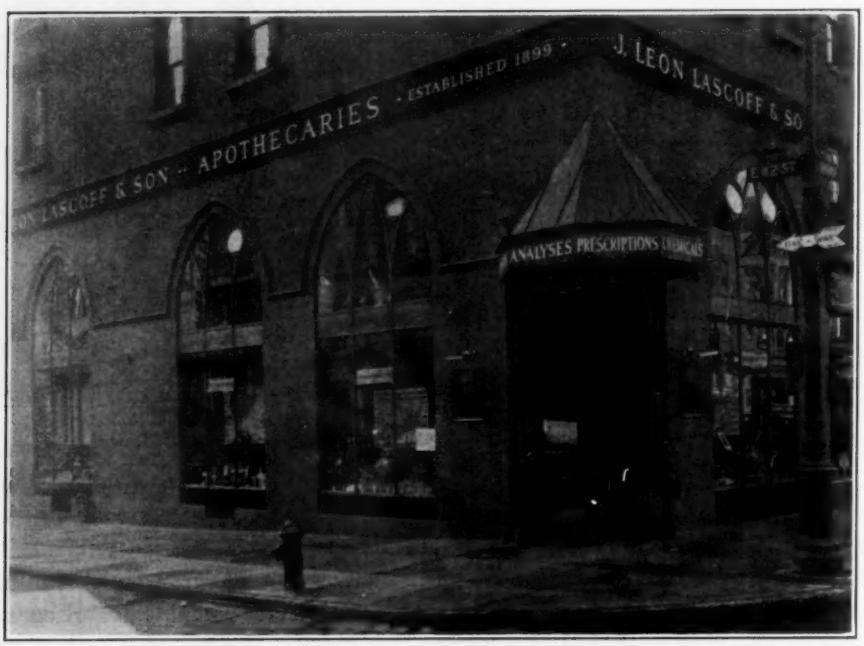
Association offices, the Concoran Gallery of Art, the American Red Cross building, Memorial Continental Hall and Constitution Hall of the Daughters of the American Revolution and the Pan American Union, and on old B street, now renamed Constitution Avenue, stands the building of the National Academy of Sciences, which with certain buildings to be erected, including a Public Health Service Edifice and the AMERICAN PHARMACEUTICAL ASSOCIATION[1] Building, will serve as a frame for the Lincoln Memorial. Like it, they are also of the monumental classical type and reveal the work of distinguished architects."

The architect for the Pharmacy Building, Mr. John Russell Pope, has completed the design for the structure, which is well known to pharmacists and approved by the Commission of Fine Arts, and the erection of the building will be begun as soon as the plans of the Government for the development of the area in which it is located are completed.

In his report to the Miami meeting Chairman Dunning said, "The development of plans for such an important area requires time and careful consideration. The delay, while very trying to us, is more than compensated for by the assurance that our building will be surrounded by such splendid structures and that the adjoining area will be protected against change and deterioration."

Pharmacy is fortunate to have such a commanding location for its building in the National Capital.—E. F. K.

[1] See map in *National Geographic Magazine*, November, page 521; about half way down on left, the site is diagonally opposite the National Academy of Sciences.



Front view and show windows, Lascoff Pharmacy, New York City.

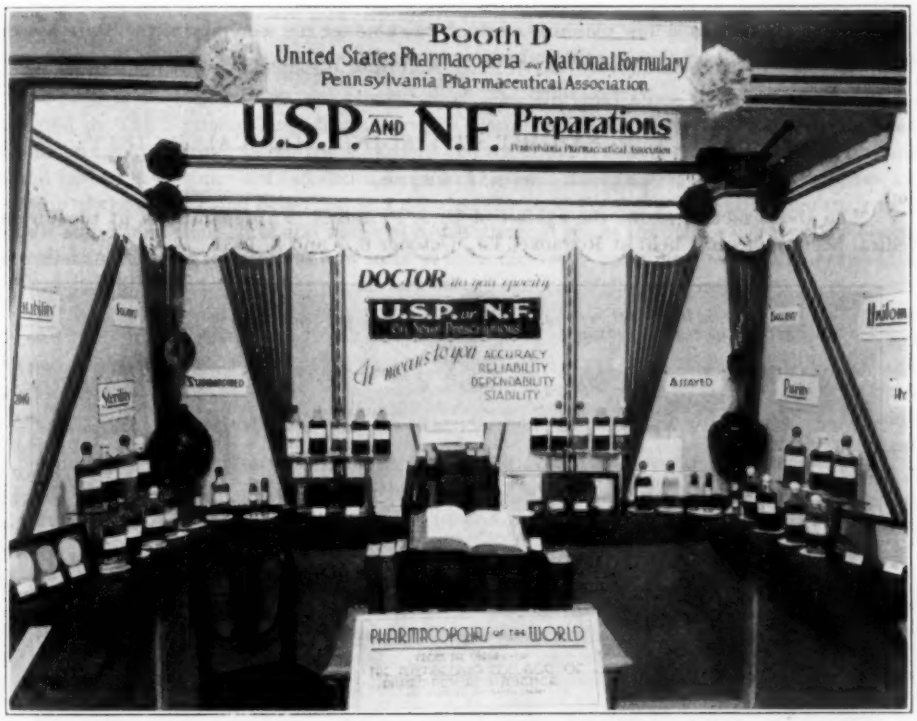
POPULARIZING U. S. P. AND N. F. PRODUCTS AMONG PHYSICIANS.

BY J. B. PILCHARD.

The Pennsylvania Pharmaceutical Association displayed at the annual meeting of the Medical Society of Pennsylvania in Scranton, Oct. 5th to 8th, U. S. P. and N. F. products, in an effort to more effectively acquaint the physicians with these products, to the end that they in turn would prescribe more of them.

The display was set up in a special booth in the scientific exhibitors' section, in the Masonic Temple Building, the headquarters of the meeting. President Henry Brown was in charge of the Exhibit and was assisted by Bernard Foote, Archbald; Frank P. Kelly, Carbondale; T. A. Shannon, Dickson City; Mrs. Lulu A. (Morgan) DeLucca, Thomas Evans and Louis Gardier of Scranton, and J. B. Pilchard of Harrisburg.

The display was attractively decorated in blue and white; a mortar and pestle that was over 100 years old was set high in one corner of the display; a beautiful show globe holding three different colored liquids was placed in each corner of the display. Twenty-eight official



The Pennsylvania U. S. P. and N. F. Exhibit.

liquids were displayed in eight-ounce paper-capped bottles, bearing a label giving the official name, together with the ingredients with their respective amounts, also designating whether U. S. P. or N. F.

There were also eight samples of crude drugs and ten samples of official ointments spread between two sheets of plate glass so that their smoothness could be easily seen. On the display counter, in full view, was a group of books over which was a card bearing the title "Pharmacists' Reference Books." These books consisted of the United States Pharmacopœia X, the National Formulary V, the United States Dispensatory XXI, the Pharmaceutical Recipe Book I, Merck's Index IV, New and Non-Official Remedies 1931, Useful Drugs and Technic of Medication—Fantus. On the table of the booth was displayed Pharmacopœias of the World in which collection was included one of the oldest Pharmacopœias of the United States. This collection was loaned by the Library of the Philadelphia College of Pharmacy and Science.

During the convention many physicians visited the booth and asked questions regarding the various products, all showed a deep interest in the work that was being done. Each physician was given two booklets—one booklet giving "A Therapeutic Classification of Some of the U. S. P. X Drugs," prepared by the Board of Trustees of the United States Pharmacopœial Convention; the other booklet entitled, "Notes for the Physician" from the National Formulary prepared by the AMERICAN PHARMACEUTICAL ASSOCIATION.

The interest manifested in official products displayed and the booklets passed out, and by the great number of questions asked is sufficient evidence to prove that the physicians of our State are deeply interested in knowing more about U. S. P. and N. F. products, and it is quite certain that local medical societies are willing to coöperate with local pharmaceutical associations that will disseminate information regarding official products among their group. The time is now here for local associations to use the material furnished by the U. S. P. and N. F. Committee of the N. A. R. D. and methodically mail their U. S. P. and N. F. folders to physicians in their community, first getting the endorsement of the local medical society. Any local association that is planning such work can be assured of the coöperation of the Pennsylvania Pharmaceutical Association.

If any association is now planning work of this kind let the secretary of the State association know and he will be glad to explain how he can assist.

U. S. P. AND N. F. EXHIBIT AT VIRGINIA MEDICAL SOCIETY.

BY N. G. MILLER.

The above picture shows the exhibit of U. S. P. and N. F. preparations, at the Virginia Medical Society meeting held at Roanoke, Va., October 6, 7 and 8, 1931.

U. S. P. and N. F. exhibit at meeting of Medical Society of Virginia by Virginia Pharmaceutical Association.

The display was well received and commented upon very favorably by the physicians. They appreciated the fact that it was placed there to establish a better coöperation between

the physician and pharmacist and the bringing to their attention the U. S. P. and N. F. preparations. There were 56 eight-ounce bakelite capped bottles and 11 sixteen-ounce bottles, all neatly labeled with the imprint of The Virginia Pharmaceutical Association on each label. The high-powered lamp above caused the different colored preparations to show up most brilliantly.

Each physician was given a small booklet, published by the N. A. R. D., on some important U. S. P. and N. F. preparations.

Many questions were asked and many comparisons made between these preparations on exhibit, and others of a similar character.

It is a big step toward getting back to old-time pharmacy. Now that this work has been started, there should not be any let up, until every physician in the United States realizes that it will be to the advantage of every one concerned to prescribe only U. S. P. and N. F. preparations.

HOW THE NATIONAL DRUG STORE MERCHANDISING SURVEY WILL BENEFIT RETAIL DRUGGISTS.*

BY FRANK A. DELGADO.

Drug and Chemical Consultant, U. S. Department of Commerce.

I believe that all present are familiar with The National Drug Store Survey now being conducted by The National Drug Store Survey Committee, with the United States Department of Commerce coöperating. Your trade journals and the house organs of the chemical and pharmaceutical houses have since last fall endeavored to keep you informed regarding the objective and operation of the Survey and believing, as I do, that the most successful druggists read their trade journals and attend their state and national conventions, it seems that there is very little else for me to relate other than to point out how some of these facts may be applied in such manner as to be practical and direct benefit to the retailer and other branches of the drug industry.

I was serious in the remark I made regarding the value of trade journals, and in connection with our preliminary work in St. Louis we had it brought home rather forcibly. We were about ninety miles south of St. Louis looking for a typical country store and found an extraordinarily attractive one. It actually excelled many of the drug stores encountered in St. Louis, or for that matter, any large city. It was well lighted and the window displays, as well as the store interior were faultless. The proprietor was crippled and seated in a wheel chair. When we expressed surprise at encountering such a modern and beautiful store at such a distance from a large city, he informed us that a great deal of the credit was due the trade journals which he read most assiduously while confined to his wheel chair and that when he read an exceptionally good article about any department of the drug business that he thought could be applied to his own store, he gave it a trial. The moral of this aneceote is obvious.

Before discussing the application of the Survey, I would like to quote Mr. C. C. Concannon, Chief of the Chemical Division of the Department of Commerce, who in a recent address remarked "During the conduct of the National Drug Store Survey, no phase of drug store operation will receive more detailed and careful attention than its professional side."

I do not believe that any one doubts the value of facts and as I previously remarked, I desire to discuss the application of the facts that we are discovering in the 14 stores that are being surveyed in St. Louis, but before doing so, I want you to bear in mind that each of these drug stores is a prototype of thousands of others throughout the country. Facts developed from each of the Survey stores are adoptable to every store of its type in the country.

About the first thing I want to tell you about the National Drug Store Survey is that if it accomplishes nothing else, its undertaking will be justified by the fact that preliminary figures decidedly indicate that the average drug store has not turned into a mere lunch counter or small department store and that drugs, chemicals, proprietary medicines and hospital supplies account for 46 per cent by value and 63 per cent by number of items of the 11 usual commercial type of drug stores now being surveyed in St. Louis. The percentages mentioned are, of course, only preliminary, as the Survey only got under way last April; likewise any other figures that I may quote are not to be considered final, as they will be based upon preliminary findings.

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* Section on Commercial Interests, A. PH. A., Miami meeting, 1931.

One of our principal sources of information for the facts that we propose to place at your disposal is about 100,000 stock cards. Such a card has already been filled out for every item in 13 of the 14 stores. These commodity cards will be the central points around which our commodity cost are molded. The card for each commodity, in each store will show its average inventory, number of purchases, average purchase, source of supply, discount, number of sales, selling price, value of sales, cost of sales, gross margin, operating expense, net profit and turnover. In addition to this information for each commodity handled, an analysis will be made of merchandise losses through spoilage, as well as an analysis of returned goods and discount sales, *i. e.*, sales to doctors, employees and others receiving special discount prices.

A complete inventory of the stores was the first step in the actual field work and this will be repeated next October and at the close of the study. This inventory has thrown light on the number of items a drug store stocks, a subject that druggists have discussed *pro* and *con* for a number of years and about which there seemed to be wide divergence of opinion. For example, a survey made by McKesson and Robbins stated that the average capacity of each drug store is about 15,000 different items, as against the 50,000 which are sold through all drug stores. However, for the 11 independent stores that we are surveying, the number of items was much less, ranging in number from approximately 2700 in the smallest inventory, to about 9000 in the largest, while sales ranged from $18,500 to $77,000 yearly.

Incidentally, the store with 2700 items achieves the excellent record of nearly nine turnovers a year and practically equals the sales of two of the stores with from 5000 to 10,000 items, and actually has larger sales than two of the other stores.

When I state that a store has a certain number of items, I do not necessarily mean brands or products; for example, if a proprietary remedy or chemical is put up in three sizes, we have a card for each size. Naturally, all purchases made during the period of the survey will be posted, by source, to these cards and, as a result, we will definitely be able to tell just which brands and sizes are selling the best and the turnover and profit in each.

For the present these cards are being filed alphabetically under eight major departments. They are Prescriptions, Proprietary (patent) Medicines, Hospital Goods, Toilet Preparations and Articles, Tobacco, Confectionery, Fountain and Sundries.

The value of the cards to manufacturers has already been demonstrated several times. For example, an executive of a large proprietary laxative pill concern called at the office of the Survey in the St. Louis College of Pharmacy and was informed that while information regarding any particular brand could not be divulged, it would be possible to show at the end of the Survey just how the sales of laxatives were divided as to form, that is, liquids, salts, pills, tablets, etc. A representative of a toilet preparation house manufacturing a deodorant was agreeably surprised to hear that these stock records would enable him to ascertain in what form body deodorants were most popular, that is, liquids, creams or powder.

Still another instance of the practical value of these cards is illustrated in some facts regarding the stock of crude botanical drugs and allied natural products are carried in drug stores nowadays. None of the 11 drug stores being surveyed had less than 62 cards listing crude drugs, gums, balsams, spices, waxes and related products, whereas one store had as many as 154. This does not necessarily mean that each card represents a different item, inasmuch as in some cases one item was represented by 2 or 3 cards, due to the fact that the substance was handled in different forms, *i. e.*, powder or leaves, or in different sizes, such as ounce packages and bulk.

It is interesting to note that it is not necessarily the old-fashioned drug stores that carry the largest stock of crude drugs; as a matter of fact, it was such a store that stocked the minimum number, whereas a modern store at an important traffic center carried the largest number, followed by a store in a fashionable suburban neighborhood with 139.

The inventory value of those products for four of the stores that handled 68, 80, 93 and 115 different kinds was valued at $16.12, $20.68, $31.97 and $34.00, respectively. While at first glance these figures may seem very low, being an average of approximately only $26.00 per store, their importance becomes greater when it is considered that if this is representative of the country as a whole, the 60,000 or more domestic drug stores stock approximately $1,560,000 worth of these products. This figure is not a negligible percentage of our total domestic production and foreign trade in crude drugs and related natural products.

Time does not permit of relating the numerous other important facts that these cards are designed to reveal; it will suffice to say that when they are finally filled in and tabulated they should point out the source of profit and loss in a drug store, as well as those items which are carried at a loss which loss must be made up on other items.

In addition to the inventory cards that I have just been describing, there are a number of other cards and forms. Each one is designed to reveal a number of important facts when at the end of the year they are all filled in and tabulated.

One of the Department of Commerce officials is W. H. Meserole, Store Management Expert, who is in charge of some of the most interesting studies being conducted by the Survey. I will touch upon a few of them. First there is the time check of sales transactions. A trained observer with a stop-watch and a pack of special forms will record details of every transaction from the time the clerk begins to wait on the customer until he has finished and is ready for another one. Of course, the observers will not be able to check every customer in this way, but in the course of a few months they will be able to get a good picture of the selling activities of drug store clerks. After checking off the sex and apparent age of the customer and the code number of the sales person, the observer notes the article asked for, whether or not brands are specified, whether the customer bought anything and whether it was the brand for which he asked. He also checks whether the clerk persuaded or advised the customer in making the purchase, if the sale was made at a busy time, if the article was on special sale, if it was processed at the time of the sale; if it was packaged and if it was delivered. The value of the sale is also recorded. At the same time he is using the stop-watch to record the selling time, wrapping time, time spent in receiving payment and the total time consumed in the transaction. And if this were not enough, the observer is required to write remarks about the selling efforts of the clerk and reasons for his success or failure.

By this procedure it is aimed to secure a check on the amount of underselling or overselling done in different types of drug stores and toward different types of customers. It will also provide a check on brand substitution and the value of special sales and of sales effort by clerks.

The early part of this month Mr. Meserole engaged 30 young men for an intensive soda fountain study. The object of this campaign will be to study each soda fountain intensively for six weeks, including Sundays (3 in the summer and 3 in the winter), from the time the store opens until it closes. Each transaction that goes over the fountain will be recorded, as well as the total cost of each operation, and of all merchandise that goes into the sale. The inventories and the purchases over that period of time will be known and we will definitely be able to tell you whether soda fountains are profit or loss departments.

Mr. Meserole, is also making a traffic check or study and has certain forms whereon will be recorded, by different periods of the day, the number and kinds of persons passing the store and whether they pass without looking into the window; look into the window and then pass on; look into the window and then enter; or enter the store without noticing the window. This naturally leads into the study of the pulling power of different types of window displays.

Preliminary results of this study would seem to indicate that only a small percentage of passersby are looking at drug store windows. Perhaps the remedy is to have fewer of the stereotype lithoprinted windows that are seen so frequently these days and substitute some educational window displays that will impress not only the customers, but secure the good will and coöperation of physicians as well. There is a splendid article by Prof. Anton Hogstad, Jr., on the subject in the July issue of *Merck's Report*. I have seen some of the window displays referred to in the article and in my opinion an occasional window of this character will not only serve to attract the favorable attention of the passersby but aid materially in establishing the standing and professional character of the pharmacy making such displays. Remember that in the last 10 or 15 years merchandise that you used to consider exclusively yours is to-day being sold in 5 and 10¢ stores, department and other kinds of stores. However, prescriptions, biologicals and certain other scientific products are still the prerogative of the pharmacist. Therefore, I really don't think you will go wrong if in addition to having an occasional professional window you resurrect that old symbol of pharmacy—the show globe, or the gilded mortar and pestle—or both—and display them prominently.

Another of the Department of Commerce officials who is bending every effort to make the Survey a success is Nelson Miller. Mr. Miller has a multiplicity of tasks assigned to him, as

well as the responsibility of engaging local personnel and office administration. It was up to him to see that the stores selected were well scattered over the city of St. Louis and that every distinct type of community was represented. One of Mr. Miller's studies that I believe would interest you the most, as its application is readily perceptible, is that regarding special sales.

All special sales in the stores are being checked and incidentally, there is hardly a day that passes in St. Louis—and many other cities—but that the consuming public is faced with sales. Frankly, they are not a big success in the St. Louis independent stores under survey. Perhaps results are the same everywhere else. Maybe the consumer is getting "fed-up" with sales. The experience of our most progressive independent proprietor, who went to great effort to prepare a special anniversary sale, was that the sale netted him on sales items $123. The discount that he gave during the sale amounted to $17. The cost of advertising and the cost of souvenirs that he gave away ran his total cost, including his discounts, to $117. As a result of that sale he sold $200 of additional merchandise in his long profit merchandise, that is, merchandise which he might not have sold had it not been for the special item on sale.

We compared his normal sales for that week end period with the sales stimulated by the special sale. We found that he increased his sales to $200 at a cost of $117. The gross margin that he made on that $200 increase on long profit merchandise amounted to about $67. In other words, it cost him $117 in discounts and other costs to get a gross increase of $67. Obviously, it did not pay.

Mr. Miller finds that staple items sell best on sales, particularly antiseptics, soaps, tooth paste, tooth brushes, rubbing alcohol, aspirin tablets, epsom salts, sodium bicarbonate, laxatives, candies, talcum powder, face powder, cotton, gauze, bandages, adhesive plasters and razor blades. On the other hand he found poor results on such items as earache remedies, toothache drops, larkspur lotion, etc. Yet some druggists actually spend money advertising sales of these items, which money is wasted unless toothache and earache becomes a subject of daily occurrence, which God forbid.

There will be a wholesale study under the direction of J. R. Bromell, the department's wholesale expert. It will consist of two steps. The first step will be a study of wholesaler-retailer relations, and will comprise an analysis of all purchases made by 300 retail druggists in the St. Louis market. Retailer purchases will be analyzed in relation to such characteristics as the retailer's total volume, type of store and character of community. The second step will be a study of wholesaler-manufacturer relations, and will cover three big wholesalers and will seek to determine the channels by which drug products reach the market and to define the position of the wholesale druggists as a service agency for the retailer.

A very important phase of the Survey, particularly to the retailer, is that part being conducted by B. B. Aiken, Merchandising Research Specialist of the Department. Mr. Aiken originally planned to study consumer demand through interviews with 200 selected consumers chosen from the neighborhood surrounding each of the ten stores. However, he may substitute a questionnaire containing 50 questions to be mailed to several thousand consumers. If this does not prove satisfactory, the original plan of personal interviews will be carried out.

Field work has been started in the Business Failure Study. This work is being actually conducted by R. T. Williams, who is working under the direction of Victor Sadd, of the Department, in charge of Bankruptcy and Credit Studies. Much valuable data has been collected to date, which will go into the report of business failures. This subject will be the first available final report on the Survey.

Other features of the Survey will be a credit study by Dr. W. C. Plummer. . Dr. Plummer was loaned to the Department by the University of Pennsylvania for a National retail credit survey.

The problem of store location will be in charge of Miss I. K. Rolph, an expert in this phase of merchandising. Part of her work will consist of a study of the relationship of all St. Louis drug stores, both independent and chain, to the population of the city, traffic facilities, residence rentals, zoning laws and other data obtainable from census figures and other published works.

A study of great importance to the independent merchant will be conducted by Dr. S. L. Kedzierski, of the department staff, who will work out budget and control methods suitable for the average drug store so that when the Survey is finished any retailer can get up a system whereby he can learn for his own store the same things the department has learned from the 11 sample stores.

Other department experts will make studies of store arrangements and sales promotional methods. Both of these projects will be worked out with the proprietors of the stores studied and at their expense.

I now come to the prescription department. This phase of the Survey will be under my supervision. Prescriptions and prescription department items may not be responsible for even 10 per cent of your gross receipts, although for urban centers I am convinced they are approximately double this figure but their importance cannot be measured only in dollars and cents; it is the one thing that lifts the drug stores out of the field of pure commercialism and entitles it to professional recognition.

The Department of Commerce has, from the inception of the Survey, tried to make it clear that the professional side of the drug store was to receive the greatest possible attention. We recognize that the Prescription Department is really the base or foundation of the drug store and that no matter how good a merchandiser a pharmacist may be, he is first of all a pharmacist, a professional man and as such he renders a service to the community quite different from that of the ordinary storekeeper.

One of the first steps that I made to try and assure the success of the prescription study, was to secure the coöperation of such leaders of pharmacy as Professors E. Fullerton Cook, E. N. Gathercoal, R. P. Fischelis and others. These gentlemen were very helpful and some of them expressed the opinion that the study should be of incalculable value.

Quite recently Julius H. Riemenschneider and Samuel S. Henry of the National Association of Retail Druggists honored the office of the Drug Survey with a visit. I invited them to call attention to any important point in our prescription analysis which might have been overlooked, and I trust that you will do likewise.

A study will be made of the prescription department of the 11 usual commercial type drug stores, the two chain stores and a large professional drug store in a medical building. We will probably analyze from 35,000 to 40,000 prescriptions in these stores, in fact approximately 2000 prescriptions have been tabulated for each of the 13 stores up to this time, and we will analyze 5000 to 10,000 in the professional store beginning on or about the first of November. After the full number of prescriptions have been tabulated they will be analyzed and the information broken down to show the following:

The average number of new prescriptions filled per day, divided into narcotic and non-narcotic; also the average number of refills and liquor prescriptions.

The number filled for each month in the year, to show seasonal variation.

The form in which they are dispensed, such as liquids, tablets, capsules, ampuls, ointments, powders, suppositories, etc.

Nature or character of the prescription, that is, official (meaning United States Pharmacopœia or National Formulary), manufacturers' or proprietary pharmaceutical specialties, or combination of official and proprietary ingredients.

The average number of ingredients in each prescription, according to form.

The extent of compounding, if any.

The average price, according to form, and the factors upon which prices are based, such as the material, time, etc.

The percentage of prescriptions written in the metric system.

The number of prescriptions calling for capsules, when the druggist indicated the size of the empty capsule used.

The total number of physicians writing the prescriptions studied and the frequency with which each doctor's name appears on the prescriptions.

The extent of delivering prescription.

The extent of legibility and other information.

Some information regarding prescriptions is already available regarding the stores being surveyed. However, it must be understood that the figures given in no way represent a complete picture of conditions. They are too limited to be used statistically, except as indicating matters to be more thoroughly examined and in no sense final. In the 11 independent stores for which figures are available, the number of individual drug, chemical, galenical and pharmaceutical items on hand in the prescription department vary from 754 to 2351.

The store with the smallest number of prescription department items was in a neighborhood type of community with no physicians of the specialist type calling on it for service and with no hospitals in the vicinity. These facts alone, however, may not account for this surprisingly small number of prescription items, since this store's general policy is one of low inventory and fast turnover, the total number of items in the store being 2426 and its annual turnover about ten times.

When we have complete and final inventory figures for the Prescription Department, I think they will shed some very interesting light as to the extent pharmacists have invested in manufacturers' pharmaceutical proprietary specialties. Preliminary figures for four of our stores show the investment in these products amount to $135, $250, $268 and $429, respectively, or from 19 to 36 per cent of the total inventory value of the prescription stock of these stores, or an average of 29 per cent. Later on, when the percentage of these proprietaries entering into the prescriptions analyzed is known, we can better determine to just what extent these figures quoted were justified.

We have partially completed the prescription analysis for one store and find that in filling the 1200 prescriptions 524 different ingredients were used in 2480 separate quantities, or an average of 2.0 per prescription. The 1200 prescriptions were divided into 180 narcotic and 1020 non-narcotic prescriptions. The narcotic prescriptions averaged 3.1 ingredients each; the non-narcotic 1.9 ingredients each. Of the 524 ingredients, only 61 occurred more than ten times. The order of occurrence was as follows: 241 ingredients had an occurrence of only one; 78 occurred only twice; 48 occurred only three times: 37—4 times; 16—5 times; 13—6 times; 12—7 times; 14—8 times; 5—9 times; 7—10 times; 4—11 times; 7—12 times; 6—13 times; 4—14 times; 3—15 times; 1—16 times; 3—17 times; 1—18 times; 2—19 times; 2—20 times; 2—21 times; 3—22 times; 1—24 times; 1—25 times; 1—27 times; 1—28 times; 1—29 times; 1—30 times; 1—33 times; 2—38 times; 1—41 times; 1—43 times; 1—52 times; 1—54 times; 1—68 times; 1—78 times; 1—82 times; 1—88 times.

This store filled a total of 4891 prescriptions during the fiscal year May 1, 1930–April 30, 1931, of which 2571 or 52.5 per cent were new and 956 or 19.5 per cent were refills and 509 or 10.5 per cent were narcotics and 855 or 17.5 per cent were liquor prescriptions. The average number of prescriptions filled a day were 13.4. There was a wide seasonal variation, particularly for new and narcotic prescriptions. The Winter months were the best, beginning with December and reaching a peak during February. The period, May to November, ran very even, the number of prescriptions being filled during any of these months numbering only half of the February figure.

The 1020 non-narcotic and the 180 narcotic prescriptions analyzed represented prescriptions written by 253 physicians or an average of 4.75 prescriptions per physician. This was considered a very good distribution, there being only a few instances where any one physician accounted for a large number of the prescriptions analyzed. However, the following instances occur: one physician wrote 105 prescriptions or 8.7% of the total, another 75 prescriptions or 6% of the total, a third 42 or 2.5% of the total and a fourth 39 or 2% of the total. Indicating the wide distribution in prescription writing, it might be said that 49 physicians wrote only two each, and 111 physicians wrote only one each.

Liquid prescriptions constituted approximately 60 per cent of the total number of prescriptions filled, followed by capsules with approximately 20 per cent and tablets 12 per cent. Ointments were fourth with 5 per cent, bulk powders $2^1/_2$ per cent and charts $1^1/_2$ per cent, the remainder being divided into suppositories, pills, ampuls, etc.

Liquid prescriptions constituted 45% of the narcotic prescriptions, capsules 40%, while tablets and other forms accounted for the remaining 5%.

This store had an average charge of $.86 per prescription; non-narcotic prescriptions averaged $.85 each, while narcotic prescriptions averaged $.94 each.

Non-narcotic prescriptions containing only official ingredients were priced at an average of $.75 each, while non-narcotic prescriptions containing a combination of official and proprietary ingredients averaged $.92 each and non-narcotic prescriptions consisting entirely of proprietary ingredients averaged $1.00 each. Thus it will be noted that the price of the prescription increases proportionately to the extent that it contains proprietary ingredients.

Proprietary prescriptions form approximately 27% of the 1200 prescriptions analyzed in this store; combination prescriptions represented 18% and official prescriptions represented the remaining 55 per cent.

While 226 of the 1200 prescriptions were dispensed in capsule form, the pharmacist only indicated the size of the empty capsule employed in only 124 instances.

Nine per cent of the 1200 prescriptions analyzed were written in the metric system.

Out of the 1200 prescriptions analyzed, prescriptions with only one ingredient occurred 500 times; those with 2 ingredients 241 times; those with 3, 174 times; with 4, 73 times; with 5, and more ingredients, 32 times. There were no prescriptions with more than 9 ingredients.

The prescriptions were examined for legibility. In this connection 851 were marked fair, 293 good and 56 poor.

No doubt the most valuable part of the prescription study will be the tabulations of the actual drugs prescribed as to kinds, brands and number of times each was prescribed. The result I believe will throw a much needed light on the stock requirements of the present-day prescription departments. Furthermore, we intend to place this data at the service of the National Formulary and the United States Pharmacopœial Revision Committees.

We already have a tabulation of the 200 most widely prescribed drugs in the 1200 prescriptions analyzed and find that after distilled water, codeine sulphate led with a frequency of occurrence of 82, other frequencies in order of their occurrence were acid acetyl salicylic 78 times, phenol 68 times; sodium bicarbonate 54 times; acetphenetidin 52; caffeine citrate 43; elixir phenobarbital 41; elixir lactated pepsin 38 and Neo-Silvol 38.

Forty-six of the 200 most widely prescribed drugs were proprietaries.

We expect that our best source for a wide variety of prescriptions to be analyzed will be the professional prescription store in the Medical Building previously referred to, if for no other reason than that it has been in business approximately thirty years and we will be able to make comparative studies over this period, the results of which should give some very interesting trends.

In conclusion, I would like to say that it is my belief that in spite of the rather small number of prescriptions the average drug store is filling the final results of the survey are going to vindicate the prescription department and show conclusively that for the amount invested the receipts are entirely satisfactory. Preliminary figures for four stores, three of which are doing a small prescription business indicate that annual prescription sales amount to from a minimum of three to as many as six times the value of the investments. The investment, of course, being figured at cost.

I believe that you will be able to draw some very interesting conclusions from the final report of the prescription phase of the National Drug Store Survey. No one will deny the efficacy of facts, and our study of the prescription departments of the drug stores being surveyed will, I believe, place at the disposal of all branches of the drug industry certain data that I trust may prove of practical application.

THE FARADAY CENTENARY.

On September 10th the 100th anniversary of important discoveries in physics and electricity by Michael Faraday and Joseph Henry were commemorated in Schenectady by the American Physical Society at the opening session of its 172nd meeting.

The tributes to Faraday and also Henry, who were connected with the Albany Academy, were delivered in the new auditorium of the General Electric Research Laboratory.

A paper on the work of Faraday, written by Sir. William Bragg, British scientist, was read by Professor John Zeleny. Henry's work was extolled by Professor W. G. Magie of Princeton University.

Papers on various questions of applied physics were read by several scientists and research workers at a subsequent meeting in Union College.

ELEMENT 87 DISCOVERED IN MINERAL SAMARSKITE.

Element 87 has been discovered in a substance known as samarskite, a lustrous velvety black mineral found in Norway, Siberia and some of the southern states of this country. Two million pounds of it contain one pound of Element 87. Discovery of this element by Professor Jacob Papish of Cornell University, leaves only one of the ninety-two elements unidentified, that being No. 85. It is an insoluble solid and cannot be isolated because of its high inflammability; it may have possibilities for use with photo-electric tubes because it is unusually sensitive to light; however, its presence in samarskite, used in the experiments, was in such small proportion that Professor Papish was convinced that it will never be abundant.

PROCEEDINGS OF THE LOCAL BRANCHES

"All papers presented to the Association and Branches shall become the property of the Association with the understanding that they are not to be published in any other publication prior to their publication in those of the Association, except with the consent of the Council." —Part of Chapter VI, Article VI of the By-Laws.

ARTICLE III of Chapter VII reads: "The objects and aims of local branches of this Association shall be the same as set forth in ARTICLE I of the Constitution of this body, *and the acts of local branches shall in no way commit or bind this Association, and can only serve as recommendations to it.* And no local branch shall enact any article of Constitution or By-Law to conflict with the Constitution or By-Laws of this Association."

ARTICLE IV of Chapter VII reads: "Each local branch having not less than 50 dues-paid members of the Association, holding not less than six meetings annually with an attendance of not less than 9 members at each meeting, and the proceedings of which shall have been submitted to the JOURNAL for publication, may elect one representative to the House of Delegates."

Reports of the meeting of the Local Branches shall be mailed to the Editor on the day following the meeting, if possible. Minutes should be typewritten with wide spaces between the lines. Care should be taken to give proper names correctly and manuscript should be signed by the reporter.

BALTIMORE.

The Baltimore Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION began its 1931–1932 activities with an opening meeting at the Emerson Hotel, on Thursday, October 22, 1931.

The following interesting and comprehensive reports were submitted:

Dr. Howell W. Allen discoursed upon the salient features of the recent N. A. R. D. meeting at Detroit.

Dr. E. F. Kelly presented a résumé of the proceedings of the Miami meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION, emphasizing the progress that has been made, and noting, that in spite of general adverse business conditions, Pharmacy appears to be holding her own.

Dr. John C. Krantz, Jr., reporting upon the fall regional meeting of the Maryland Pharmaceutical Association, set forth clearly the fact that our State Organization permits no phase of Pharmacy, whether scientific or commercial, to escape its careful scrutiny.

Dr. Charles L. Meyer, the principal speaker of the evening chose for his topic "Random Notes on Retail Pharmacy" and accompanied his address with quite a comprehensive and pertinent demonstration.

Dr. Meyer is a retail pharmacist of many years' experience and during the course of his professional career has developed many ingenious methods and created many clever devices as aids in the accurate, rapid and efficient compounding of prescriptions. These subjects formed the basis of what proved to be a very entertaining and instructive lecture.

WILLIAM F. REINDOLLAR, *Secretary-Treasurer.*

CHICAGO.

The 199th meeting of the Chicago Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held in the gymnasium of the Professional Schools, Y. M. C. A., 1804 W. Congress St., Chicago, on the evening of Tuesday, October 20th, at 8 o'clock. The meeting was presided over by President Hynes.

The speaker of the evening was Dr. W. A. Evans, well-known physician and lecturer and conductor of the "How to Keep Well" column of the Chicago *Tribune.* His subject was "Weed, Plant Parasite and Insect Destroyers."

Dr. Evans began his discussion by calling to our attention the extent to which insect diseases were controlled during the World War. He stated that to know how to combat an insect we must know all of its habits. We must know where it likes to live, what it likes to eat, etc.

The mosquito has been conquered by man through use of screening, volatile oils in petroleum, drainage, use of oil on stagnant ponds, and by fish (larvicides).

Many weeds are more adapted to our gardens than those plants which we cultivate. Weeds have been controlled by cutting and pulling, and now weed poisoning by the use of chemicals is supplanting the older methods.

These chemical formulas can easily be secured by the public from the State Department

of Agriculture or the U. S. Department of Agriculture. Chemical formulas for the destruction of plant parasites can also be secured from the same department.

Dr. Evans suggested that this was an open field for the pharmacist inasmuch as most of these preparations are called for by the public in the drug stores.

In the discussion following Dr. Evans' address, Dr. Fantus suggested the inclusion of several formulas for the destruction of insects, plant parasites, weeds and insect-carrying animals in the Recipe Book of the National Formulary.

Following the discussion a rising vote of thanks was extended to Dr. Evans and the meeting was adjourned.

LAWRENCE TEMPLETON, *Secretary.*

DETROIT.

The Detroit Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION opened the 1931–1932 season with a well-attended meeting, Thursday, October 22, 1931, held in the Y. M. C. A. Building. The session was preceded by a dinner which was enjoyed by a large number.

President James Liddell opened the meeting by outlining his plans for the ensuing year and requested that the student body give hearty coöperation, so that they may be deserving of the trust placed in them by the ASSOCIATION. The minutes of the May meeting were read and approved.

The first speaker of the evening was Dr. Wilbur L. Scoville. He gave a very interesting report of the meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION, held in Miami; 136 scientific papers were presented. The speaker said that the problem to-day is to put pharmacy on a more scientific basis. Pharmacy must find out why certain actions occur in different preparations and how to stabilize them. He mentioned several preparations that were discussed and given much thought and time in research laboratories to-day. He said Fluidextract of Ergot is rendered inert by heat; better methods of manufacture are necessary for a more stable product of this important drug. Tincture Digitalis is another example of the large amount of research that is necessary.

Mr. Scoville said that percolation was used away back in the dark ages; water, wine and vinegar were used for extracting the medicinal principles; alcohol was used for the purpose about 400 years ago; he said that extraction methods need to be improved; exhaustion of a drug, to get the desired effect, is not always accomplished, as in the case of Rhubarb and Cinchona. The job for pharmacy is to find out why; only then will pharmacy be put on a scientific basis. Dr. Scoville defended the "gunshot" prescription, saying results are far easier to obtain than when a single drug is administered in most cases.

In defense of the formulas in the National Formulary, which physicians often refer to as "gunshots," Dr. Leonard A. Seltzer said the physician, in comparing N. F. preparations with proprietaries, did not realize that while the proprietary had one name, the formulas contained as many or more items to complete the preparation. Much consideration is being given to N. F. preparations in establishing palatability, color and effectiveness; to accomplish this it is often necessary to use a formula containing many items.

The next speaker, J. H. Webster, referred to the 33rd Annual Convention of the N. A. R. D. held in Detroit as one of the most outstanding conventions ever held. With the opening, Mayor Frank Murphy's unusual address that reached the hearts of pharmacists throughout the country, the convention continued to be unusual throughout the entire program. The business sessions were crowded to standing room on several occasions. The entertainment, the exhibits, all were unusual in that not a single complaint was registered. The attendance was large, taking into consideration the condition of the business world. Mr. Webster said the pride that pharmacists have in the local and state associations helps to increase the attendance at N. A. R. D. conventions.

One of the outstanding speakers of the meeting was Hon. Clyde Kelly, who is the master of the price-cutting situation. He said the future of our country is impaired and the youth is robbed of the opportunity to establish himself in business to-day, owing to the ruinous price-cutting by the chain and department store. The Capper-Kelly Bill, which will be brought up this fall for action, will be the first step in stopping this unfair trade practice.

W. Bruce Philip, of California, held his audience for several hours, in reporting the results of the California Survey, compiled from 40,000 questionnaires.

Druggists were complimented by Dr. James M. Doran for the splendid manner in which

they conducted themselves in regard to alcohol records and regulations. Dr. Harry J. Anslinger, of the Narcotic Division also gave the druggists of the country a similar clean bill. Dr. Wilmer Krusen of the Philadelphia College of Pharmacy was one of a number of inspiring speakers.

A motion by Mr. Webster, was duly supported and approved—that the Detroit Branch go on record by sending a suitable resolution to Senator James Couzens, Congressman Clarence J. McLeod and Robert H. Clancy informing them of our stand on the Capper-Kelly Bill and asking their support.

President Liddell thanked the speakers in behalf of the Branch.

BERNARD A. BIALK, *Secretary.*

NEW YORK.

The Pharmacy Week meeting of the New York Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held on Monday, October 12th, at the College of Pharmacy, Columbia University; 69 members attended of whom a number were present at the Get-Together Dinner which preceded the meeting.

The chair was taken by the president, Dr. Robert P. Fischelis, who called upon the secretary to read the minutes of the May meeting; these were approved.

Treasurer Curren's report was read and accepted.

Dr. Mayer, for the Audit Committee, reported that he had passed upon the bills presented to him.

Dean Dandreau submitted 43 applications from students of St. John's College of Pharmacy for Student Membership, Professor Canis 33 from the Fordham College of Pharmacy and the Secretary 33 from the College of Pharmacy of Columbia University. These were approved.

The applications of Messrs. Reginald C. Brown, Charles C. Caruso, J. J. Durrett and William J. Greenberg for membership in the parent organization were submitted, and the meeting approved the application of Mr. Carl Lipschitz for membership in the New York Branch.

President Fischelis requested that his resolutions which had been under consideration by a committee be withdrawn.

Mr. Lehman, as president of the Academy of Pharmacy, reported progress for the Joint Committee of the Academy and the New York Branch in regard to Physician-Pharmacist meetings in New York.

Dr. Schaefer made a motion for the president to appoint a committee consisting of one member from each of the four local Colleges of Pharmacy and three other members, this committee to consider ways and means to entertain the delegates to the joint meeting of the Boards and Colleges of Pharmacy of District No. 2, in March 1932.

The President called the attention of members to the Remington Medal Dinner in honor of Prof. E. Fullerton Cook at Philadelphia on Monday, November 16th, and said he hoped that as many as possible would attend.

The Scientific Section was opened by the president introducing Dr. Charles W. Ballard to read his report on "Trends in Pharmaceutical Progress in Education."

Dr. Ballard said that he based his report on personal impressions at sessions of the American Association of Colleges of Pharmacy and the Section on Education and Legislation of the AMERICAN PHARMACEUTICAL ASSOCIATION. The first sessions of the former were devoted to teachers' conferences dealing with chemistry, materia medica, pharmacy and pharmaceutical economics; one topic of discussion was the term "materia medica" as a title for a specific course in the pharmacy curriculum, it being considered by some to be too broad and other titles such as "pharmacology" and "pharmacognosy" were suggested. In the conference of teachers of pharmacy, a general weakness in simple arithmetic on the part of students entering college was reported as being country-wide. In the general sessions, the most important topic of discussion was the four-year course and the syllabus for that course.

In the Section on Education of the A. PH. A., eleven papers were read and discussed. The chairman of the Section reviewed the progress of pharmaceutical education in this country during the past 100 years. Dr. Ballard remarked that at the first meeting which he had attended of the A. PH. A. in 1914, he remembered pleas for the adoption by pharmacists for a greater respect for the practice of pharmacy and for more extensive educational requirements; advances have been and are being made but pharmacy still needs something to awaken respect for itself within itself.

At this point in the meeting, owing to the fact that Dr. Newcomb had to leave early,

the other reports on "Trends in Pharmaceutical Progress" were held over until the latter part of the evening.

In beginning the Pharmacy Week program the President called upon all to rise in a moment's silence in respect for the memory of the late Dr. Robert J. Ruth, the Father of Pharmacy Week, who had addressed the Branch last year at this time.

The President welcomed to the platform Dr. E. L. Newcomb, acting chairman of the National Pharmacy Week Committee, who spoke on "Pharmacy Week Work Accomplished for 1931."

Dr. Newcomb spoke first of the origin of the idea of Pharmacy Week, telling how it came into existence and said that he wished to pay his personal tribute to the late Dr. Ruth who had lived for it day and night and died in its service. In taking over the work he had carried out Dr. Ruth's plans for this year, which were similar to those of previous years.

Dr. Newcomb read the President Hoover Proclamation on Pharmacy Week and said that it would be read over the two radio broadcast chains and published in newspapers throughout the country. He paid special tribute to the splendid work and coöperation of Editor Herbert R. Mayes of the *American Druggist* in securing full-page Pharmacy Week Messages in metropolitan dailies, and to Editor Jerry McQuade of *Drug Topics* who obtained a portion of the time of 40 broadcasts of pharmaceutical manufacturers' programs—this was nearly three times as many as last year. He read a list of titles of 18 Pharmacy Week messages that had been prepared by the National Pharmacy Week Committee as suitable for radio broadcasting, newspaper releases and for talks before Rotary Clubs and other organizations. He spoke of the award of a silver cup by the Federal Wholesale Druggists' Association for the best professional window display in the country for Pharmacy Week. The speaker drew attention to the Pharmaceutical Educational Map prepared by the N. W. D. A., the window strip given jointly by the A. PH. A. and the N. A. R. D., the poster by Merck and Co., and the Pharmacy Week display material of the *American Druggist*. He said that 16,000 copies of the Map had been distributed, the purpose of which was to inform the public that 30,000,000 was invested in 75 colleges of pharmacy in the country and that nearly 10,000 students were enrolled in these institutions. He felt that these facts could not but help make the public think more of pharmacists. Merck and Co. had distributed 20,000 copies of their poster called "Your Pharmacist" and a pamphlet containing suggestions for professional window displays prepared by Anton Hogstad, Jr., of their staff.

Dr. Newcomb concluded by saying that Pharmacy Week was being more fully and closely observed this year than ever before and that no pharmacist could afford to overlook it.

A discussion took place in which Dean Dandreau, Dr. Lichtman, Mr. Lehman, Dr. Lascoff and the Secretary took part, and among other things it was suggested that the National Association Boards of Pharmacy carry out their registration of pharmacies during Pharmacy Week each year and draw the attention of pharmacists to the possibilities presented through its observance.

A rising vote of thanks was accorded to Dr. Newcomb by the meeting.

The President then resumed the program dealing with reports on "Pharmaceutical Progress as Revealed at Recent Pharmaceutical Conventions," and called upon Dr. Schaefer to report on the Professional Trend.

Dr. Schaefer showed, by a comparison of the papers presented before the A. PH. A. conventions in 1918 and 1931 together with a tabulation of the number of papers for each classification, the trend that was taking place in retail and manufacturing pharmacy. A decided increase in the number of papers on pharmaceutical chemistry and biological assaying was noted, while there was a decrease in the number of papers presented on botany, practical pharmacy and dispensing.

Professor Bonisteel and Mr. Currens discussed the present-day position of botanical drugs.

Mr. Lehman was introduced by the President to speak on the Commercial Trend, and gave a comprehensive account of the commercial activities at the A. PH. A. Annual Meeting and at the New York State Pharmaceutical Association Convention. He referred to the Bruce Philip survey of commercial conditions in California, the "National St. Louis Drug Survey" by the Department of Commerce, the reports on the "Average Price of Prescriptions in Columbus, Ohio and Buffalo, N. Y.," and the "Maryland Prescription Count," many other papers presented before the Section on Commercial Interests of the A. PH. A.,

and resolutions approved at the general meeting. He made special mention of President Gesoalde's address at the State Convention, and the speech of the Hon. Clyde Kelly, author of the Capper-Kelley Bill; he also reported upon the resolutions approved by the ASSOCIATION.

Dr. Wimmer rose to state that he had recently attended a meeting of the Legislative Committee of the N. Y. State Pharmaceutical Association, at which it was resolved to reintroduce two bills which were not passed by the Legislature last year—(1) The wholesalers' liability with regard to the sale of proprietary remedies (those being poisonous, habit-forming or with deleterious ingredients) and their control by the State Board of Pharmacy; (2) Raising the experience limit for apprentices from 15 to 17 years of age for registration with the Board of Pharmacy. In conjunction with the N. Y. Independent Retail Merchants' Association, it was decided to introduce a State Capper-Kelly Bill as well as a Chain Store Tax Law.

Dr. Lichtman of the Department of Health, said that the Department was making surveys of small syrup manufacturers and had found that some of them were engaged in bottling Tincture of Iodine, Sweet Spirit of Nitre and other pharmacopœial products without a pharmacist or chemist in charge; if pharmacists knew of such cases they should report them to the Health Department.

President Fischelis reported on the Legislative Trend in Pharmaceutical Progress, and reviewed what took place at the N. A. R. D. Convention. He said that the maintenance of prices for drug merchandise was everybody's uppermost thought; that one of the outstanding features of the Convention was the address by Bruce Philip on the survey he had made on commercial conditions; that the convention had planned to introduce a revised Capper-Kelly Bill on the original principles of the bill and would omit the amendments made to it at the last session of Congress. He stated that the California Junior Capper-Kelly Bill was in operation and that the Dr. Miles Medicine Company had established a special unit in California for the purpose of showing the pharmacists their desire to cooperate with them in accordance with the full intentions of the bill. Dr. Fischelis pointed out that automobile manufacturers were legally able to obtain fixed resale prices on the agency system and he saw no reason why the law should not permit the sale of drug store merchandise in the same way. He felt that under the present business conditions it would be a good thing for the retail pharmacists to keep their clerks employed in turning out their own pharmaceuticals and packaging their own goods, rather than buying manufactured and packaged articles.

After a rising vote of thanks to all the speakers, the meeting adjourned and the Pharmacy Week window display material that had been sent to the Branch by the Chairman of the National Pharmacy Week Committee and by Merck and Co. was distributed to the members.

HERBERT C. KASSNER, *Secretary.*

PITTSBURGH.

The regular monthly meeting of the Pittsburgh Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held Tuesday evening, October 20, 1931, at the Pittsburgh College of Pharmacy. The meeting was called to order by President Stephen Wilson.

A report was submitted by Dr. C. L. O'Connell, who served as delegate to the House of Delegates at the Miami meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION. He indicated that the spirit of Professional Pharmacy prevailed throughout the entire meeting, and seemed to be the primary point of discussion. He mentioned that Pharmacy was getting deserved consideration in relation to a place in the Medical Corps of the United States Army, and strongly emphasized the need of centralized control during time of war, or an emergency.

The President then introduced Mr. B. F. Daubert of the Pittsburgh College of Pharmacy.

Mr. Daubert presented a paper entitled "The History of Soap Making." This was followed by interesting discussion of work that has been accomplished with soaps, particularly the soft variety. There was much discussion concerning the value of soft soap as an ointment base. Mr. Daubert indicated that investigation would continue until something definite materializes. The members joined with the president in thanking the speaker for the informative presentation.

Officers for the current year: *President,* Stephen Wilson; *Vice-President,* Lester V. Moore; *Secretary and Treasurer,* Frank S. McGinnis; *Delegate to House of Delegates,* C. Leonard O'Connell; *Committee on Program,* Lester V. Moore, Robert W. Taylor, Clarence T. Van Meter.

Time of Meetings: Third Tuesday of each month, 8:00 P.M. at the Pittsburgh College of Pharmacy, 1341 Boulevard of the Allies, Pittsburgh, Pa.

FRANK S. MCGINNIS, *Secretary.*

THE PITTSBURGH EXPERIMENT.

Representing a unique innovation in American Pharmacy during National Pharmacy Week by Merck & Co., Inc., in coöperation with the University of Pittsburgh College of Pharmacy as held in the City of Pittsburgh during the 1931 National Pharmacy Week. The features were:

(1) Professional Pharmacy Demonstration in the lobby of the Jenkins Arcade Building embodying the following:

(*a*) *The Fine Art of the Apothecary:* Students of the University of Pittsburgh College of Pharmacy engaged in the fine art of the Apothecary at special type prescription desks to portray to the laity and to members of the medical profession that much skill and training are required in the preparation of well-rounded pills, neatly folded powder papers, etc., and that such work comprises much more than mere mixing as commonly thought.

(*b*) *Pharmacognostical Studies:* Students actually engaged in the macroscopical and microscopical examination of crude and powdered drugs.

(*c*) *Pharmaceutical Processes:* Percolation and other pharmaceutical processes conducted by students.

(*d*) *Chemical Experiments:* Qualitative chemical experiments such as existing conditions made possible.

(*e*) *Materia Medica Studies:* Students actually engaged in preparation of drug monographs, making use of extensive technical library proved for this purpose as well as for general literature citation work.

(2) Series of five (5) lectures covering various phases of present-day status of Professional Pharmacy to students of University of Pittsburgh College of Pharmacy by Anton Hogstad, Jr.

(*a*) "Man—A Custom-Built Institution."

(*b*) "Acres of Diamonds in Our Own Back Yards."

(*c*) "Personal Contact Relations with the Medical Profession."

(*d*) "A Five-Year Program of Preparation after Commencement."

(*e*) "Professional Windows That Click."

(3) Series of Professional Windows as prepared and installed by students of the University of Pittsburgh College of Pharmacy in local retail pharmacies.

(*a*) "The Story of Cinchona (Quinine Bark) 1630–1931."

(*b*) "Drugs of the Scriptures."

(*c*) "Some Quaint and Mysterious Drugs."

(*d*) "My Alma Mater."

(*e*) "Milestones in Medicine and Pharmacy."

(*f*) "Famous Discoveries by Famous Pharmacists."

(4) Faculty Meeting: Dr. C. L. O'Connell—*Chairman.* Dinner at Hotel Wm. Penn at which time the faculty of the University of Pittsburgh College of Pharmacy was entertained by Merck & Co., Inc.

Following the dinner Mr. Hogstad spoke on the subject: "The Present-Day Need for a Course in Professional Pharmacy." Discussion followed in which all present took an active part.

(5) National Pharmacy Week Banquet:

A gathering of the faculty, students and alumni of the University of Pittsburgh College of Pharmacy together with other retail pharmacists, nationally-known American pharmacists and friends. Some 250 were present on this occasion.

Program as follows:

Toastmaster, Dr. C. Leonard O'Connell.

Address of Welcome, J. A. Koch.

"An Editor Looks at Pharmacy," Herbert Mayes.

"A Teacher Looks at Pharmacy," Louis Saalbach.

"A Pharmacist Looks at Pharmacy," Henry Brown.

"A Student Looks at Pharmacy," Melvin Green.

"A Physician Looks at Pharmacy," I. H. Alexander.

"Mighty Glad to Be a Pharmacist," Anton Hogstad, Jr.

WESTERN RESERVE UNIVERSITY STUDENT BRANCH.

The November meeting was called to order at 7:30 P.M., Friday, November 13th, in Adelbert Hall.

This was a short business meeting, and after adjournment the student members attended a joint meeting with the Northern Ohio Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION.

Dr. F. W. von Oettingen, Assistant Professor of Pharmacology, School of Medicine, Western Reserve University, spoke on "The Effect of Physical Factors and Drugs on Intestinal Activity," illustrated by motion pictures.

JOHN A. OBESTER, *Secretary*.

INTERNATIONAL PHARMACEUTICAL FEDERATION.

The meeting of the Bureau of the International Pharmaceutical Federation convened at Budapest on October 26th. Propositions from various organizations belonging to the Federation were presented which were deemed of interest and value to the constituent bodies. Up to this time we have not had a report of the meeting, however, mention is made of a number of propositions which have come before that body. The AMERICAN PHARMACEUTICAL ASSOCIATION has presented an invitation for the Federation to meet in the United States in 1933.

The Pharmaceutical Society of Great Britain suggests that a suitable subject for an inquiry by the International Federation is the extent of qualified and unqualified practice of pharmacy in the different countries represented by membership in the Federation and information is requested relative to the following:

1. Is the dispensing of medicines required by doctors confined to pharmacists?
2. Is the sale of medicinal specialties restricted to pharmacists?
3. Is the sale of substances such as insulin, vaccines, sera, etc., restricted to pharmacists?
4. How are those medicines which may be sold by unqualified people determined? Is it by means of a list of things they may sell, or a list of things which only pharmacists may sell?
5. What special restrictions apply to the sale of poisons for use in agriculture and horticulture, such as preparations containing arsenic for dipping sheep?

Another report in which the AMERICAN PHARMACEUTICAL ASSOCIATION has had a part is represented by the report of the Committee on the Control and Examination of Medicines on Board of Ships. The following gives an outline which probably has received further consideration at the meeting in Budapest. Propositions that are submitted to the Bureau, if deemed of sufficient importance, receive consideration at the general meetings.

"The Eighth General Assembly of the International Pharmaceutical Federation held at Stockholm, from the 16th to the 19th of July, 1930, requested the Commission which had reported upon the control and examination of medicines on board ship to prepare a formulary of compound medicaments used on board ships. The formulary was to indicate the composition of the medicines mentioned under special names and to employ Latin for the principal titles. From the information already in the possession of the Commission a draft formulary for the use of pharmacists supplying medicines to ships has been prepared. It covers eleven countries and is based upon the medicines required to be carried by the ships of these countries. For each country the formulary is divided into two parts. The first part is a glossary giving the name by which each medicine is known in the language of that country and an equivalent Latin name. The second part contains the formulae for any medicines for the composition of which there is no general international standard. The intention is that the formulary shall be used in the following way. If a Danish ship is in a French port, the Captain may send to a French pharmacist for further supplies of *Borsyre* and *Ojenvand*. The French pharmacist will refer to the Formulary and will find in the glossary for Denmark that *Borsyre* is *Acidum Boricum*. This he will be able to supply from his stock. He will find that the second one is *Guttæ pro Oculis*. By reference to the pages giving the formulae of the Danish preparations he will find what is the formula for this and how it is to be prepared. The countries included in the formulary are Belgium, Denmark, France, Germany, Great Britain, Greece, Netherlands, Sweden, Portugal and the United States."

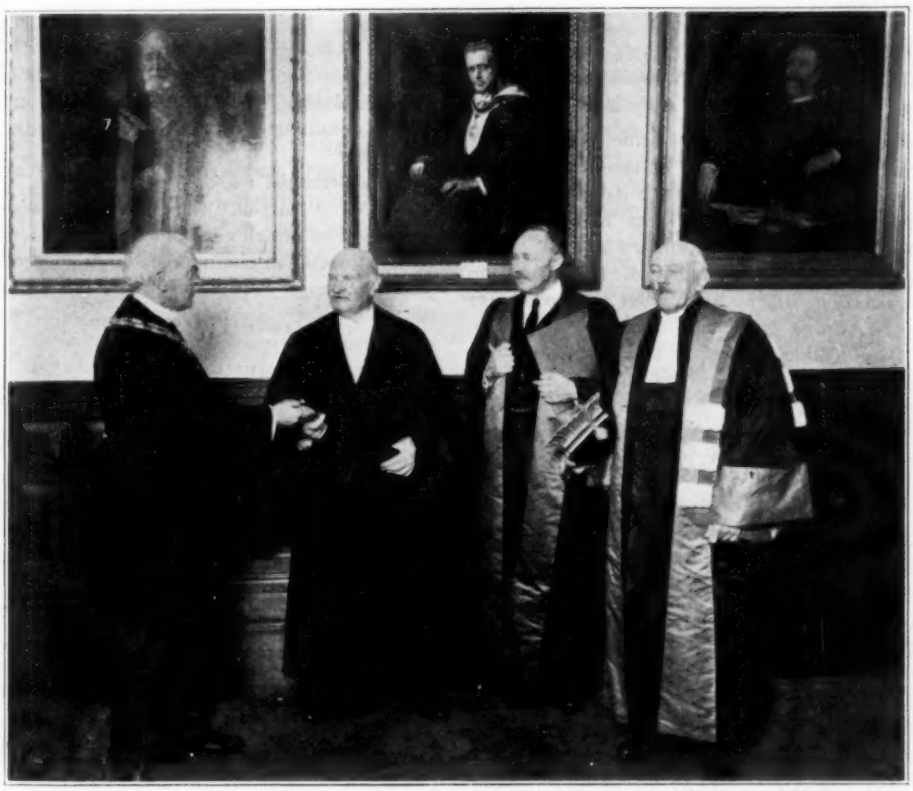
DR. HERMANN THOMS AWARDED THE HANBURY MEDAL FOR 1931.

Dr. Hermann Thoms, of Berlin, is an honary member of the AMERICAN PHARMACEUTICAL ASSOCIATION, and is the twenty-third recipient of this honor. Three American pharmacists have thus been honored: Prof. John M. Maisch, Dr. Frederick B. Power, Dr. H. H. Rusby.

It is somewhat difficult to speak of Dr. Thoms' outstanding activities; the most recent is his monumental work "Handbuch der praktischen und wissenschaftlichen Pharmazie." He

was the founder of the Pharmaceutical Institute at Berlin of the German Pharmaceutical Society and is the editor-in-chief of the *Archiv der Pharmazie* and the *Berichte*. A sketch by Dr. Edward Kremers will be found in the July JOURNAL for 1923, page 569. President A. R. Melhuish, of the British Pharmaceutical Society, in presenting the medal spoke in highest terms of his accomplishment and paid deserved tribute to the indefatigable worker, who had well earned the recognition of the memorial, founded in honor of one of Great Britain's foremost pharmacists, Daniel Hanbury. The proposal that the memory of the latter should be perpetuated is due largely to Mr. Thomas Greenish and Professor Dragendorff; the first recipient was Dr. Flückiger.

Professor Thoms, after a brief expression of thanks in German, said in part: "It is evidence of a high state of culture and noble sentiments when a nation keeps the memory of its great sons alive. In this respect England has always been an example to all other countries. Daniel Hanbury belongs to those great men who have contributed in the highest degree to the scientific knowledge, not only of their own country, but of the whole world. When that classical volume, 'Pharmacographia,' the work of Hanbury in collaboration with his friend Flückiger, appeared, it was recognized in all civilized countries that in Hanbury an earnest and able investigator had



Courtesy of the Pharmaceutical Journal and Pharmacist.

PRESENTATION OF THE HANBURY MEDAL TO DR. HERMANN THOMS.

In the picture are shown, left to right, President A. R. Melhuish, of the British Pharmaceutical Society; Dr. Hermann Thoms, Hanbury Medallist; Prof. G. E. Gask, dean of the Faculty of Medicine, University of London; Prof. H. G. Greenish, dean of the School of Pharmacy.

The portraits above the group are as follows: Left to right, John Williams, president of the Pharmaceutical Society, 1878–1879; Edward White, president, 1913–1918; Michael Carteighe, president, 1882–1896.

arisen who had raised the knowledge of drugs to a science, and had made pharmacognosy an important member of the group of natural sciences. The Pharmaceutical Society of Great Britain, in whose School of Pharmacy Hanbury was a student, may count it a high honor that Hanbury, who soon attracted the attention of learned societies, was one of their members. When the Pharmaceutical Society celebrated its jubilee in 1891, I had the honor to take part in the meeting, as representative of the German Pharmaceutical Society. On that occasion the Hanbury gold medal was presented to Dr. O. Hesse, of Feuerbach, for his scientific services in the investigation of alkaloids, and I shall never forget that solemn and impressive ceremony. I, myself, have now the honor of standing in the same place and of receiving from you, Mr. President, in the name of the Pharmaceutical Society, the coveted Hanbury medal. I beg of you to accept my sincerest thanks for this high distinction which is the source of the greatest satisfaction, not only to me personally, but to my country, and gives the most definite proof that science knows no bounds but is the common property of all nations.

"Your Society has always shown itself ready to work in friendly collaboration with my country for the advancement of science. For that also, Gentlemen, I must offer you my heartiest thanks. May the scientific efforts of your Society be crowned with success in the future as in the past, and may they continue to contribute to raising the status of pharmacy of all civilized countries."

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

Twenty-six or more scientific societies have signified their intentions of meeting with the American Association for the Advancement of Science at its New Orleans meeting, from December 28, 1931 to January 2, 1932. This meeting, the eighty-ninth of the American Association, will be held under the presidency of Dr. Franz Boas, of Columbia University. Tulane University will be the host institution. Prof. D. S. Elliott, is chairman of the local committee for the New Orleans meeting. The AMERICAN PHARMACEUTICAL ASSOCIATION is affiliated with the A. A. A. Sc.

FEDERAL INSPECTORS DETAIN ONLY 3 PER CENT OF DRUGS IMPORTED IN 1931.

Officials of the Federal Food and Drug Administration's eastern district examined 3677 shipments, aggregating about 40,000,000 pounds, of crude drugs in the year which ended July 31, 1931, according to W. R. M. Wharton, chief of the district. The lots included some 250 varieties and were inspected for conditions which might preclude their entry, under the Federal food and drugs act, into this country. Two hundred eighteen shipments, amounting to 1,271,367 pounds, or three per cent of the total quantity of drugs examined, were detained for violation of the law. Figures for quantities of shipments and detentions do not include licorice root and castor seed, inasmuch as only a small quantity of these products are used for medicinal purposes, says Mr. Wharton. In the previous year, the district examined approximately 61,000,000 pounds of crude drugs, detaining about 5,500,000 pounds, or 9 per cent.

"The principal reasons for detentions," declares Mr. Wharton, "were moldiness, worminess and low potency in some drugs; excessive foreign matter in chamomile; high content of yellow styles in saffron; excessive ash and low alkaloid in stramonium; and in sandalwood detentions were made because non-U. S. Pharmacopœia varieties were substituted."

DISPENSING CALOMEL AND POTASSIUM BROMIDE IN POWDERS.

The mixture in powder form as prescribed in the following prescription is found to turn grey, and is obviously incompatible: Calomel, $1^1/_2$ grains; potassium bromide, $2^1/_2$ grains; sugar of milk, 2 grains. If the powders are perfectly dry, the calomel is mixed with half the lactose, the bromide with the other half, and the two powders are mixed, no reaction will occur for months, provided no trace of moisture gains access to the mixture. In presence of moisture, the powder turns grey due to liberation of metallic mercury and formation of mercuric bromide, a highly toxic salt. The prescription is therefore dangerous. The dose of mercuric bromide is $^1/_{16}$ to $^1/_4$ grain for an adult. The above prescription might result in the formation of over 1 grain of mercuric bromide.—*Chem. and Drugg.*, 114 (1931), 58; through *Quarterly Journal of Pharmacy*, 4 (1931), 265.

EDITORIAL NOTES

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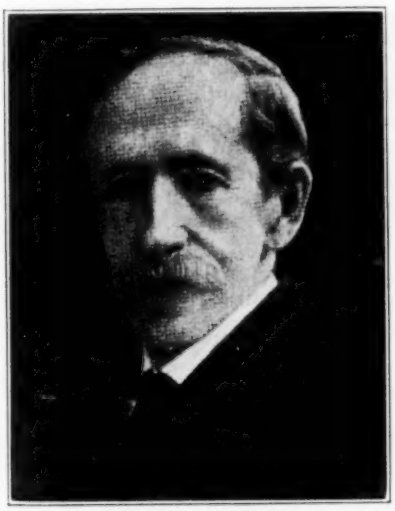
THE CENTENARY OF CHLOROFORM—THREE CO-DISCOVERERS—LIEBIG, SOUBEIRAN AND GUTHRIE.

In the May number of the JOURNAL for 1931, page 481, appears an article on "The Centenary of the Discovery of Chloroform;" in this, Samuel Guthrie, Baron von Liebig and Eugene Soubeiran are named as co-discoverers. The



SAMUEL GUTHRIE.

reference to the *American Journal of Science and Arts* (1831), in the U. S. Dispensatory, published in 1845, is of historical interest and value in connection with the records of the discovery. Guthrie supplied his product to Professor Silliman and Dr. Eli Ives; the latter administered Guthrie's chloroform by inhalation—the first chloroform administered in that way; Simpson was the first to use chloroform in surgical practice.

This comment has been prompted by an article in the contributors' columns of our esteemed contemporary—the *Pharmazeutische Zentralhalle* of October 1, 1931, page 628, by Max Speter, on the centenary of chloroform, wherein the name of Samuel Guthrie as co-discoverer was not included. *In our opinion*—this was an inadvertent omission, and that correction will be made in a succeeding issue of the *Pharmazeutische Zentralhalle.*

Records indicate that Guthrie made chloroform ("chloric ether") not later than October 1831, probably (?) in May 1831.

Quoting Ossian Guthrie:

"My recollection in relation to the discovery of chloroform is almost as vivid as though it had occurred yesterday. On the 28th of February, 1831, I was five years old. On the 29th of April, 1831, my *brother Wardell* (now of this city (Chicago)) was born. At that time *my father* was assisting *my grandfather* in his laboratory and his residence was then, and had been from my earliest recollection, but a short distance away, as was also my grandfather's residence. My father's youngest sister, about four years my senior, my sister about two, and myself, had almost unrestricted privileges in the laboratory; and there, before the birth of my brother, we tasted the agreeable flavor and inhaled the never-to-be-forgotten odor of 'sweet whisky,' the local, and may I add, the spontaneous name applied to the first

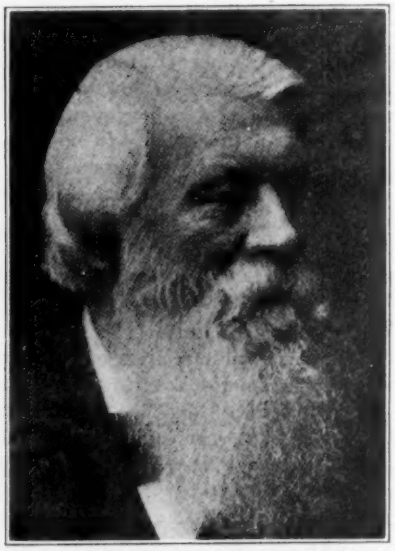
distillate ever obtained from alcohol and chloride of lime."

In a letter, Prof. William B. Day states:

"I have linked this up with a statement from E. O. Gale's 'Reminiscences of Early Chicago' in which Gale speaks of Ossian Guthrie as the son of Alfred Guthrie, one of the pioneer settlers of Chicago and states also that Alfred had two other sons named *Wardell* and Samuel. In the paragraph referred to above, Ossian refers to his brother *Wardell*. Evidently Dr. Samuel Guthrie, the discoverer of chloroform was Ossian Guthrie's grandfather."

TWO EMINENT BRITISH PHARMACISTS.

"*The Biograph* is a monthly magazine containing sketches of eminent living men selected from all ranks, conditions and opinions of mankind. The October number (1881) contains twenty-five such biographies, and we notice that we have some sort of claim to four of them. The career of Professor Attfield, F.R.S., who is one of the twenty-five, is very closely associated with pharmacy. . . . The sales of his "Manual of Chemistry" have reached an aggregate of 25,000 copies. Another gentleman reported on is Mr. Joseph Wilson Swan, of Newcastle, whose success as an inventor in regard to the electric light must not be allowed to eclipse the fact that *he is still*, as he has been from his early days, a chemist and druggist. Mr. Swan has been at work on his lamp for more than twenty years. . . . Perhaps it is not generally known that Mr. Swan was also the inventor of the photographic printing process known as the 'autotype;' his collodion is familiar wherever photography is practised."—The *Chemist and Druggist*, October 15, 1881.



SIR JOSEPH WILSON SWAN—1828-1914.

An English pharmacist noted as a pioneer in electric carbon filament lamps.

Joseph Wilson Swan was knighted in recognition of his discoveries; our records indicate that throughout life he was a pharmacist. He was a pioneer in photographic processes, electric carbon filament lamps and electrodeposition of metals.

NATIONAL PHARMACY WEEK.

Quoting the *Bulletin of Hennepin Co. Medical Society*, Minneapolis—"The average person thinks of pharmacy in terms of the average American drug store, and does not even understand a drug store. To him pharmacy is a merchandising enterprise that distributes a variegated assortment that includes medicines among other items. He does not see the ramifying and intricate processes that finally focus in the prescription room of the corner drug store. The medicine that he purchases there may have had its origin in the depths of an African forest; it may have gone through manufacturing methods requiring the utmost exactness and scientific skill; it may have been blended with other therapeutic agents by the druggist in a dispensing service that only one in every fifteen hundred persons is competent to render. But the final buyer—the layman—sees nothing of the complicated and costly procedures that led up to this purchase.

"The comic papers and the vaudeville stage are filled with jibes about the drug store and the things which can be bought there, giving a false idea of the true place of the pharmacist in the community.

"Selling other things besides drugs in a pharmacy is nothing new. Centuries ago the druggists sold sugar, confections, jellies, spices, vinegar, flavoring and what not for use in the kitchen. Out of the ancient apothecary shop came perfumes, rouges, powders and toilet lotions. Less than a century ago you would buy paints, oils, varnishes and seeds, principally, at the drug store. Soda water (carbonated water) was invented by a pharmacist, and for generations was dispensed only in drug

stores. Other merchants have taken from the drug store much more than the drug store has taken over from their lines of trade. . . ."

" 'The chief function of the modern drug store is the practice of professional pharmacy as it relates to the promotion of the public health. In this practice the pharmacist is concerned not only in the proper dispensing of corrective agents but also in the supplying of preventive ones such as disinfectants, germicides, bacterial vaccines and antitoxins. In the dispensing of this service he is bound by an inflexible ethical code. The pharmacist is frequently consulted by his patrons on matters of health and supplies remedies as requested for simple head colds, or acute coughs or for corns or toothache. He does not attempt to usurp the privilege of the physician because he is not fitted by education or training either to diagnose or treat disease any more than is the physician by his training fitted to compound and dispense remedial agents. Therefore, when you have recited to your druggist a list of your aches and pains, real or imaginary, and he tells you to consult your physician, he is advising you in the interest of your health. Do not attempt self diagnosis because nine times out of ten your guess is wrong.'

"The pharmacist is sometimes accused of being the physician's competitor. In almost every instance it will be found that it is the pharmacist's desire to be a collaborator with, not a competitor of, the physician in the constant fight against pain and disease.

"The apothecary, druggist, pharmacist (call him what you will), has served humanity shoulder to shoulder with the physician for more than forty centuries. He is still on the job. He is better able to give service than ever before. That diploma hanging on the wall of his shop certifies to long years of study and training, and implies that he is competent to compound and dispense medicines.

"The corner druggist is from necessity a merchant. He is also the practitioner of a profession which is very necessary to the preservation of public health and well-being. Drop into his store and become better acquainted with him."

THE HOSPITAL PHARMACY IN EGYPT.

Our fellow member (A. PH. A.) in Egypt, Ali M. Elshaarani, writes that: "To the D. P. H. in Egypt belong 61 general hospitals, where seventy pharmacists and nine assistants serve. Of the pharmacists four are in the fifth grade, sixty-six are in the sixth grade and all the assistants are in the seventh grade.

"During 1930, 85,311 in-patients and 2,523,928 out-patients have been treated in these hospitals.

"All the medicines, that have been used during 1930, were brought from foreign countries and have cost about 100,000 Egyptian pounds. There are four pharmacists together with eight assistants, that permanently work in the Central Drug Stores of the D. P. H., to supply the units with about 2000 different kinds of medicines. One pharmacist and two assistants in these stores dispense the already prepared medicaments, to all units of the department.

"There is an official hospital pharmacopœia, that contains together with the formulas of the usual medicines used in the government medical units, other useful scientific information. The English system and methods are followed in this pharmacopœia. The pharmacist in a government general hospital has plenty of work to do, so often he dispenses different medicines to about 500 out-patients per day. Occasionally, he is visited by an inspector.

"In Egypt, hospital pharmacy has been greatly improved and much good is expected of it in the future, through the efforts of pharmacists, care and sympathy of the chief authorities in the D. P. H."

LONDON PHARMACOPŒIAS.

Quoting an address by Prof. G. E. Gask, published in the *Journal and Pharmacist* of October 10, 1931.—"About 1670, the first of the London Hospital Pharmacopœias was produced, to be followed rapidly by others. In the early part of the eighteenth century a remarkable reformation in English pharmacy occurred. This reformation appeared between the years 1721 and 1746, which mark the publication of the fourth and fifth editions of the London Pharmacopœia. I quote now a reference to the period by Sir William Church (St. Bartholomew's Hospital Reports, 1884–1886): Pharmacy up to that date had followed the old traditional lines, which had been adhered to from the days of Hippocrates, Galen and the Arabian physicians; the learned colleges had never had the courage to break away from the superstitious element which had played so great a part in the medicine of the Dark Ages. The world in general, as well as the practitioners of the healing art, have but a very slight idea of

the debt of gratitude they owe to the committee of distinguished men appointed by the London College to prepare the fifth edition of its Pharmacopœia, for the courage they showed in sweeping away many of those inartificial and irregular mixtures which the ignorance of the first ages introduced, as well as all, or nearly all, the disgusting substances, for the most part superstitiously and dotingly derived from oracles, dreams and astrological fancies, which up to that time disfigured our Pharmacopœias."

THE NATIONAL ARBORETUM.

As an initial step in the development of the proposed national arboretum, the marshland along the Anacostia River in the outskirts of Washington, two and a half miles from Capitol Hill, is being drained by army engineers. A tract of 268 acres of land has been purchased; the physiography of the area ranges from the water gardens of Kenilworth to the wooded heights of the Hamilton and Hickory Hill tracts, which will be included in the arboretum. The two bodies of land afford the diversity of soil and physiography needed for many types of plants.

The arboretum will have laboratory facilities as well as museum characteristics. Cultivated and wild plants growing side by side, in the same type of soil and in the same climate, will be studied to aid the breeding of more valuable species.

U. S. P. REVISION NOTES.

Chairman E. Fullerton Cook reports that the annual *Proceedings* of the A. D. M. A. for 1931 has recently been issued. The Scientific Section of that Association has been giving consideration to many problems now before the Revision Committee. Chairman Paul S. Pittenger, in his address stated "I doubt if there is anything of more importance to our member firms than the adoption by the U. S. P. and N. F. Revision Committees of proper standards and analytical processes." Among the subjects of importance in U. S. P. Revision are:

Magma Magnesia.—The present U. S. P. limits for soluble alkali are too stringent. They represent practically the water solubility of magnesium hydroxide in water. The following modified test is suggested:

"Dilute 20 cc. of Magma Magnesia with distilled water that has been recently boiled and cooled to room temperature, to make 200 cc., mix thoroughly and immediately filter, discarding the first liquid that comes through the filter. To 50 cc. of the clear filtrate, add 1 drop of phenolphthalein T. S., and titrate with tenth-normal sulphuric acid; not more than 0.4 cc. is required to discharge the red color." The determination of the amount of residue also needs revision.

Extracts of Drugs.—The relationship between an assayed extract and the drug is one point considered; tests for the absence of more than minute quantities of iron, lead or copper in preparations representing drug extraction are important. This latter problem is being studied.

The Chairman has just received a copy of the new Chinese Pharmacopœia, issued by the Ministry of Health of the National Government of the Republic of China. While printed in Chinese characters, the arrangement is alphabetical by Latin titles. No translation being available, it is impossible to make a comparison o the tests and assays but the contents indicate a consideration of the newer materia medica and also conservative therapeutic judgment.

PERSONAL AND NEWS ITEMS.

Tom Coulson, of Dallas, was the guest of honor at the meeting of Central Texas Retail Druggists' Association meeting held October 22nd at Corsicana. Cline's Collegians, named in memory of the late Prof. R. R. D. Cline (U. of Texas), furnished the musical program. **President Walter D. Adams** spoke on "What Organization Means to Retail Druggists."

Dr. Bernard Fantus, of Chicago, has recently been appointed professor of Therapeutics at the University of Illinois College of Medicine.

Prof. Paul Briggs has succeeded **Dr. L. F. Bradley** as dean of the School of Pharmacy of George Washington University. Dr. Bradley is lecturer in Commercial Pharmacy and Dr. Edward A. Krause is teaching Medical Emergencies and First Aid. **Dr. S. L. Hilton** is lecturing on Prescriptions, especially in connection with incompatibilities.

Dr. B. V. Christensen, professor of pharmacognosy and pharmacology at the College of Pharmacy of the University of Florida, has been elected to membership on the Committee of Revision of the United States Pharmacopœia, succeeding **Dr. W. O. Richtmann,** who recently resigned, because of the pressure of his university duties.

Dean Charles H. LaWall, of the Philadelphia College of Pharmacy and Science, has been elected chairman of the subcommittee on vola-

tile oils, made vacant by the resignation of Dr. Richtmann.

Dr. Hugo H. Schaefer, New York College of Pharmacy, Columbia University has been reappointed chairman of the Committee on Pharmacy and Queries of the New York State Pharmaceutical Association.

Evelyn Bye, daughter of Mr. and Mrs. Mortimer Bye, Cincinnati, and Dr. J. F. Ross, Portsmouth, Ohio, were married October 19th. The bride's father is pharmaceutical chemist for the William S. Merrell Company.

Dr. George C. Diekman has been retained a member of the New York State Board of Pharmacy, for a three-year term, at the expiration of which Dr. Diekman will have served thirty-nine years.

Dr. John J. Abel, one of the world's famous pharmacologists, has resigned from the faculty of the medical school, Johns Hopkins University, and will devote himself in the future entirely to further pharmacological research and editing the *Journal of Pharmacology and Experimental Therapeutics*.

C. E. F. Mollett, dean of the College of Pharmacy, University of Montana, for the past twenty-four years, has been granted a year's leave of absence. He has enrolled in the College of Pharmacy of the University of Florida for taking his Ph.D. degree; his major study being in the field of Pharmacology. He holds the degree of B.A. from the University of Montana and the M.S. degree from the University of Kansas.

Dean Frederick J. Wulling, on the evening of October 20th, addressed the Lions-Lincoln Medical Association at Marshall, Minn., on "The Relation of the Physician and Pharmacist to the Public." The address was part of a post-graduate University Extension course and was unusually well received and was prepared with the idea of presenting pharmacy's case to the physicians.

Prof. Curt P. Wimmer, of the College of Pharmacy of the City of New York, Columbia University, is this year celebrating the 25th anniversary of uninterrupted service on the faculty of this institution. Congratulations are extended with the hope of many more years of continued service and usefulness.

The *Chicago Retail Druggists' Association News* prints and describes a well-arranged Pharmacy Week Window in Fried's Pharmacy of Chicago. The window represented a temple of classic design.

We are in receipt of *Proceedings* of the 51st annual convention of the Wisconsin Pharmaceutical Association, prepared under the direction of Secretary Ralph W. Clark. Without any effort to make comparisons of the articles in this report we were interested in the paper of Dr. Edward Kremers, by which a scientific insight is given of the evolution of the modes of administration used and in use of vegetable drugs. In connection therewith is a diagram of fresh plant material and the processes under which it is made into preparations and products for use.

The *New Jersey Journal of Pharmacy* for October contains the *Proceedings* of its 61st annual meeting held at Atlantic City, June 16th to 19th. As frontispiece a half-tone of President Charles Schamach greets the readers. It contains a number of interesting articles; also laws relating to the practice of pharmacy in New Jersey; side heads afford convenient references.

The National Drug Clerk for November contains a number of helpful articles; Dr. Edward Podolsky continues his interesting historical articles.

The Southeastern Drug Journal presents an article on "Ethical Pharmacy" by Louis H. Jerger, Jr.; Randolph S. Hancock describes the O. Henry drug store.

The Washington Post, Magazine Section, of October 25th, contained a very interesting story of the Ledbeater Pharmacy at Arlington. This venerable pharmacy served the Washington and Lee families. An account has heretofore appeared in the JOURNAL. The illustrations show parts of the pharmacy, an order from Martha Washington, etc. A former A. PH. A. President, Richard H. Stabler (1870–1871), member of the family of earlier proprietors, was for a time actively interested in this pharmacy.

J. G. Ricketts, Ex-Army pharmacist and member of the AMERICAN PHARMACEUTICAL ASSOCIATION, Sayre, Pa., writes interestingly on Pharmacology from a Pharmaceutical Standpoint" in the *Practical Druggist* for October.

The Northwestern Druggist reports on district meetings under the direction of Iowa Pharmaceutical Association, in the form of business institutes, as reported in the minutes of the Conference of Pharmaceutical Association Secretaries. (See October JOUR. A. PH. A., page 1121.)

Eleven meetings were held, beginning at Council Bluffs and continuing at Clarinda, Ottumwa, Burlington, Newton, Sioux City, Algona, Charles City, Cedar Rapids, Maquotoka and Waterloo. Two meetings were held each day; better retail business, both in the professional and commercial fields of pharmacy, were the keynotes of the meetings. Each of the meetings was featured by an address by a local physician.

Dr. Robert L. Swain discusses prescription surveys in the *American Druggist*. He points out the variations in several surveys and presents the facts brought out in the Maryland survey. "The report on the Maryland prescription count," is printed in the September JOURNAL, page 938. Dr. Swain stresses the importance of dependable statistics; liberty is taken in quoting the last paragraphs of this forceful and earnest contribution. He concludes: It is apparent, I think, that professional pharmacy is in dire need of an earnest and devoted study. It is to be remembered that prescription practice is a phase of professional service, but it is only one phase. The prescription practice is by no means the whole of the professional service of the drug store. The compounding and dispensing of verbal orders and counter requests, the sale of hospital supplies and sick room needs, the sale of poisons and potent remedies, the handling of special apparatus requiring professional skill and competency, the giving of advice on matters of personal and public health, these and many more related activities constitute the service which pharmacy carries on. It is a service of which we, as pharmacists should know much more, and in which the public has a profound interest.

"If we were in possession of all the facts, and set ourselves to the task of using them as an intelligent professional group, the merchandising mania of the present would be significant only of our folly and as showing the road back."

Editor F. A. Lion contributes a noteworthy editorial to the *American Pharmacist* on "Pharmaceutical Loyalty," ably discussing the subject under the heads of "Loyalty to Pharmacy," "Loyalty to the Public," "Loyalty to the Physician," "Loyalty to Self."

Frank H. Freericks, of the American Druggists' Fire Insurance Co., has returned from a two months' tour of Europe. He was accompanied by Mrs. Freericks and daughter.

Prof. Dr. A. Tschirch, director of the Pharmaceutical Institute in Berne, Switzerland, celebrated his 75th birthday, October 17th. Dr. Tschirch is an honorary member of the AMERICAN PHARMACEUTICAL ASSOCIATION. His "Handbuch der Pharmacognosie" is known throughout the world as an outstanding work.

The *Canadian Pharmaceutical Association Journal* introduced **President Walter D. Adams** to its readers in the issue of September 15th. In the October number the Chairman of the Council of the A. PH. A., **S. L. Hilton,** is honored in a like manner.

The Senior Past-President, **J. U. Lloyd,** of the AMERICAN PHARMACEUTICAL ASSOCIATION, is recovering satisfactorily, following an appendicitis operation. He presided at the Detroit meeting in 1888; in 1929, his 80th birthday was celebrated by pharmacists and citizens of Cincinnati.

Dr. Lewellys Barker, known throughout the medical world and to pharmacists, was the principal speaker at the University of Maryland, School of Pharmacy, Alumni Association meeting, November 11th. He traced in a most interesting address the history of medicine and pharmacy and spoke in highest terms of the present status of pharmacy, hopeful of its continued progress. A number of other well and favorably known physicians were present and a large number of alumni and friends. The meeting was presided over by **President S. Solomon,** and **Dean A. G. DuMez** introduced the speaker of the evening. The occasion was a most delightful one, enjoyed by all in attendance.

Chairman E. Fullerton Cook was formally awarded the Remington Honor Medal November 16th, at a dinner in his honor at Hotel Pennsylvania, Philadelphia, under the auspices of the New York Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION, and the Philadelphia Branch. Report of the event will be made in next issue.

Our fellow member, **Charles E. Wilson,** has favored us with a copy of the *Daily Corinthian* which contains a very good editorial on Pharmacy Week, pointing out the service which the pharmacist renders the public and which very seldom is considered by them except as a matter of fact. Statement is also made relative to the education of the pharmacist.

DRUG TRADE CONFERENCE.

The Executive Committee of the National Drug Trade Conference held a session in Baltimore, November 2nd, preparing for the program of the annual meeting to be held in Washington, on December 9th.

SOCIETIES AND COLLEGES.

FOUNDATIONS FOR THE AID OF SCIENTIFIC WORK.

One or two American Foundations are now capitalized at approximately a billion dollars. The Carnegie Corporation is the largest foundation with a capital of nearly 160 million; the Rockefeller Foundation with nearly 150 million; Duke endowment is about 50 million. Pharmacy is hardly represented in foundations, but should be. The large manufacturers who have accumulated fortunes from the drug field should see that pharmacy is better represented by endowments for research, and also for the opportunities of larger service through the Headquarters Building in Washington, soon to become a reality.

PHILADELPHIA AWARDS FIVE RESEARCH FELLOWSHIPS.

Five fellowships for graduate research in pharmacy and related sciences have been awarded at the Philadelphia College of Pharmacy and Science.

The Henry Leffmann fellowship for pharmaceutical chemistry research was awarded to Dr. Maria A. Mesa de Ponce of Havana, Cuba, who will study the stabilization and standardization of ergot. Dr. de Ponce holds the degree of bachelor of science from the Institute of Havana and that of doctor of pharmacy from the University of Havana. For a number of years she has been assistant professor of science in the normal school in Havana. She was secretary of the Cuban commission which made the Spanish translation of the tenth revision of the U. S. Pharmacopœia and has been active in pharmaceutical circles in Cuba. Her research work will be under the direction of Chairman E. Fullerton Cook, of the U. S. P. XI, Revision Committee.

The fellowship for the study of the chemical and medicinal properties of capsicum has been awarded this year to Linwood F. Tice, former professor at Baylor University, College of Pharmacy.

The continuation of the studies undertaken at the Philadelphia College in the enteric coating of tablets and capsules has been provided for by a graduate fellowship which this year is held by Allen F. Peters, who received the degree of bachelor of science from the Philadelphia College in 1931. This fellowship is made possible through the coöperation of Eli Lilly & Co.

Another grant from the Henry Leffmann fellowship for research in pharmaceutical chemistry has been awarded to Ruth E. Miller, who will continue her studies on the antiseptic properties of the volatile oils, which was the subject of her thesis submitted for the master's degree in 1930. Last year Miss Miller conducted the research work in the antiseptic properties of iodine under the scholarship sponsored by the Mellon Institute.

Miss Elsie M. Klenke, a candidate for the degree of master of science in bacteriology, will continue her studies of podophyllum under the William H. Gano fellowship.

NEW MEXICO BOARD OF PHARMACY.

BY SECRETARY H. E. HENRY, NEW MEXICO PHARMACEUTICAL ASSOCIATION.

The New Mexico Board of Pharmacy met in Albuquerque October 19th and 20th, for their regular fall meeting, with all members present. Twenty-nine applicants, the majority of whom were from adjoining and distant states, were on hand for the purpose of taking the examination. C. C. Hausseman, for business reasons, resigned as Secretary of the Board, but still continues as a member of that body. W. H. Duckworth, a former member of the Board, was appointed as Secretary, and the Board plans on having him do some inspection work over the state. The Pharmacy laws were discussed at length and it was agreed that the Board would work in conjunction with the Pharmaceutical Association to obtain a revisement of the present laws, so that they would conform to those of other states.

The Spring meeting of the Board of Pharmacy will be held in Las Cruces, dates to be set so that members of the Board can attend the Tri-State Meeting.

President Tigner announces the following appointments of members to serve on the various committees for the Tri-State Meeting at El Paso next Spring:

Publicity, B. Ruppe, Albuquerque
Entertainment, David L. C. Hover, Cloudcroft
Banquet, L. A. Rice, Albuquerque
Finance, Harry I. Braden, Carlsbad
Program, B. G. Dyne, Las Cruces
Prize, Leon Sands, Tucumcari
Drug Show, W. W. McAdoo, Carlsbad
Dance, Roy Campbell, Fort Sumner.

ALABAMA BOARD OF PHARMACY.

The Alabama Board of Pharmacy at its meeting October 13th at Montgomery elected the following officers: *President*, S. A. Williams, Troy; *Vice-President*, L. C. Lewis, Tuskegee; *Secretary*, W. E. Bingham, Tuscaloosa; *Treasurer*, Hal Duncan, Birmingham.

PENNSYLVANIA BOARD.

The annual election of officers of the Pennsylvania State Board of Pharmacy resulted as follows:

President, L. L. Walton; *Secretary*, Charles F. Kramer. The latter is director of drug store registration and law enforcement executive.

NORTH CAROLINA PHYSICIANS INVITE PHARMACISTS.

Members of the Wayne County, North Carolina Medical Society, recently adopted a motion inviting pharmacists of the country to join the Society. At a recent meeting of physicians, dentists and pharmacists, J. E. F. Hicks, of Goldsboro, read a paper on U. S. P. and N. F. preparations.

COMMITTEE ON AWARD FOR PHARMACY WEEK WINDOW DISPLAYS.

The following have been appointed members of the Committee to judge the Pharmacy Week window displays for 1931: John H. Webster; Leonard Seltzer, Fred Ingram, Jr., G. H. Diekman, Bernard A. Bialk. All members of the Committee are prominent in the pharmaceutical profession and actively engaged in Detroit.

Only the prize windows in state contests will be submitted to them.

NATIONAL WHOLESALE DRUGGISTS' ASSOCIATION.

The 57th annual meeting of the National Wholesale Druggists' Association convened in Atlantic City, October 19th–22nd.

President James M. Penland presided over the sessions and in his address gave a general résumé of the activities of this national body. He stated that despite discouraging developments compared with those of business generally the drug trade has held up well. He directed attention to the fact that the Secretary of Commerce had reported the drug trade as rating second only to public utilities in the maintenance of volume and earnings for the year 1930, and the best information obtainable was indicative that the trade was holding its relative position during the first eight months of 1931.

Among the addresses of the meeting were the following:

"Where the Shoe Pinches in Present Distribution, with Special Reference to Changes Now Going On in Marketing, Free Deals and Retailing," Prof. Paul H. Nystrom.

"Retail Distribution," T. W. Delahanty, U. S. Department of Commerce.

"The St. Louis Survey," Wroe Alderson.

"Progress of the Work of the Statistical Division with Special Reference to an Analysis of 1930 Operating Costs of Wholesalers and A Study of the Free Goods Problem," "Principles of Drug Trade Practice Developed from Drug Distribution Cost Analysis," H. J. Ostlund.

Several abstracts from the address of Dr. Nystrom are given. He said "there is very little economic justification for free deals in which additional quantities of the same goods are added without charge and regular purchases. Three free with every dozen is nothing more nor less than a 20% cut. It is amazing that wholesalers, good business men as they are, and retailers, should be so interested and so easily taken in on these mathematical cross word puzzles. He condemned predatory price cutting as unfair and essentially dishonest merchandising." In his opinion these evils carry a long train of disastrous effects.

The programs of the meeting, both business and of entertainments, were intensely interesting and helpful. A very pleasing part of the entertainment features was the opportunity given to President Penland to have his mother witness the position held by her son in the drug world. He thanked the committees, Secretary Newcomb and all who had so efficiently coöperated during his year of office.

The publicity material, especially that of Pharmacy Week, received the commendation of the Association and in that connection the reports of Chairman Mayer and William Ochse. There are many items in the various reports which are of direct interest to retail pharmacists and some of these will receive attention in later issues of the JOURNAL.

The educational map received hearty approval and the use made of it is shown in the Pharmacy Week windows. The Association is now issuing Christmas posters which have been attractively gotten up. A Medicinal Plant Map is being considered for Pharmacy Week of 1932.

The Board of Control gave favorable expression to the work of the Druggists Research Bureau and recommended that this work be continued. Provision was made in the Constitution for an Honorary President, and William J. Mooney of Indianapolis was the first to receive the honor.

The following officers were elected: *President*, Roblin H. Davis, Denver, Colo.; *First Vice-President*, Henry Bowerfind, Fort Wayne, Ind.; *Second Vice-President*, Allen Berry, Nashville, Tenn.; *Third Vice-President*, Charles Loring, Boston, Mass.; *Fourth Vice-President*, Lee Wilson Hutchins, Grand Rapids, Mich.; *Fifth Vice-President*, P. A. Hayes, Greensboro, N. Car.; *Secretary*, E. L. Newcomb, 51 Maiden Lane, New York City; *Treasurer*, Title Guarantee and Trust Co., New York City; *General Representative*, Frank E. Holliday, New York City.

Dr. James Doran was one of the speakers of the convention. The principal speaker at the banquet was Hon. Simeon D. Fess, and William J. Schieffelin, Jr., presided as toastmaster. The retiring and incoming presidents were among the speakers at the banquet.

CHICAGO DRUGGISTS' POST.

At a meeting of Chicago Druggists' post of the American Legion, held at Gimble's restaurant, October 15th, new officers for the ensuing year were elected as follows: Eman Brzak, *Commander;* Benjamin Friedlander, *Senior Vice-Commander;* Earl Cropp, *Junior Vice-Commander;* Charles L. Reynolds, *Adjutant;* Julius Antonow, *Finance Officer;* Abe Garod, *Sergeant-at-Arms;* Maurice Siskel, Walter Harris and Bernard Weinshenker, *Directors*, and Edwin J. Backus, *Service and Medical Officer*. A resolution was adopted whereby Chicago Druggists' post will furnish all medical supplies in the future for the 40 and 8 convalescent center, and a committee composed of Edwin Backus, Henry Krueger and Benjamin Friedlander was appointed to arrange details and institute the work.—*Jour. N. A. R. D.*

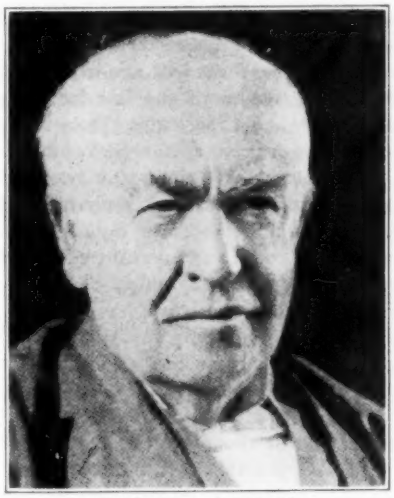
TRADE ASSOCIATIONS AND RELIEF WORK.

The importance of the activities of Trade Associations, in rallying American business behind the present emergency movement in the United States, is stressed in a statement issued November 3rd by the President's organization for incomplete relief.

OBITUARY.

THOMAS ALVA EDISON—1847–1931.

Thomas Alva Edison died in the early morning of October 18th. "Thomas Edison used science for the benefit of mankind to such a high degree, and brought science and the



THOMAS A. EDISON.

scientific method into such high report in the public regard, that it is an open question which of these two great contributions to modern civilization is the greater. Certain it is, that no other man of our generation has made a larger or more inspiring contribution."—VERNON KELLOGG, permanent secretary of the National Research Council.

JOHN MADISON TAYLOR.

John Madison Taylor—Philadelphia; University of Pennsylvania School of Medicine, Philadelphia, 1878; member of the American Climatological and Clinical Association; formerly professor of physical therapeutics and dietetics, Temple University School of Medicine; co-author of "Diseases of Children;" aged 76; died, October 3rd, in the Orthopedic Hospital, of myocarditis and chronic nephritis.—*Jour. A. M. A.*

MEDICINAL CHEMICALS.

According to a German chemical *Journal* there are 220 chemical factories in Switzerland. Their production in pharmaceutical products in 1930 amounted to 2490 tons; this includes perfumes.

LEGAL AND LEGISLATIVE.

NEW YORK STATE SUPREME COURT UPHOLDS PHARMACY LAW.

Further argument on the constitutionality of the New York Pharmacy Law was held before Justice Lewis on October 2nd wherein the previous ruling was upheld. Among the points in the decision are, that since January first, 1928, the practice of licensing pharmacists in New York was abolished entirely.

In the discussion of the law by Attorney Joseph J. Hammer, he states "Once it is realized that the druggist cannot perform the functions of a pharmacist, no greater reason exists for permitting him to own a pharmacy than for permitting the ordinary layman. In the words of the court an important consideration is that the injury to the public be proven and the surest and safest way of preventing that injury is expressed that the proprietor of a pharmacy should know his business. It might just as well be argued that the licensed druggist be permitted to practice dentistry by employing dentists and in the event the dentist violates any of the practices of his profession, the license of the druggist be revoked. It is of the essence of the practice of any profession that the complete and full responsibility be placed upon the professional himself. The only way this can be insured in the operation of pharmacies is by the method adopted by the legislature, namely, that the pharmacy be owned by a pharmacist."

CONGRESSMEN TO STUDY CANADIAN SALES TAX.

A congressional delegation of about 100 representatives have accepted the W. R. Hearst invitation for a 6-day tour in Canada to study the operation of sales tax legislation now in force in the Dominion. The information thus obtained will be at the disposal of Congress when it arrives at consideration of sales tax legislation expected to be proposed at the forthcoming session.

PROPOSED NETHERLANDS REGULATIONS GOVERNING MEDICINAL TRADE.

All medicinals offered for sale in the Netherlands, with the exceptions the Government may make, will be required to show their full and correct formulas on the packing if the new bill before the Dutch Parliament becomes law. The Government will be permitted also to prohibit printing on the wrappers or labels claims which give the impression that the medicinal or pharmaceutical preparation can cure, relieve or prevent contagious diseases (which will be listed later) or other maladies or disabilities if the Government is of the opinion the product is detrimental to health. (Commercial Attache Jesse F. Van Wickel, The Hague.)

LABEL DESCRIBING VITAMIN CONTENT.

Dr. H. C. Sherwood of Columbia University in an address before the Association of Official Agricultural Chemists, pointed out the need for regulations requiring all foods which purport to be sources of vitamins to bear the label specifying the exact amount of vitamins which the article contains.

THE UNITED STATES AND THE OPIUM QUESTION.

At the Bangkok Conference the American Consul John K. Caldwell, stated relative to smoking opium that the United States, while prepared to lend a practical aid to measures directed toward suppression of the distinctive vice, the Government of the United States is not prepared to follow a line similar and concurrent with that followed by other governments so long as these other governments elect to retain the monopoly system and are not willing to attempt prohibition.

RUTHRAUFF PATENTS FOR DENTIFRICES IN COURT.

In an opinion by the district court in Delaware (D) certain patent claims for dentifrices are found void by the court on the ground that novelty and utility are lacking. In concluding his decision the Judge stated that there is no patentable invention involved in the patents in suit and that they are therefore invalid, hence the bill of complaint was dismissed.

NORTH CAROLINA CHAIN STORE TAX UPHELD.

The Supreme Court in a decision handed down October 26th upheld the North Carolina Chain Store Tax which imposes an annual assessment of $50.00 on each store when more than one is operated by a single individual or country.

SEPARATION OF MEDICINES AND PHARMACY IN JAPAN.

The Japan Pharmacy Act provides that no one excepting pharmacists shall be permitted to prepare medicine; this has brought about considerable discussion. Physicians state that loss from such prohibition would seriously affect their income and have recently begun a campaign against the provision.

ANALYSIS OF MEDICINALS IN SWITZERLAND.

The Pharmaceutical Institute at Berne is increasing its field of activity by undertaking the analyses and control of all medicinal preparations to be sold in Switzerland and to supply reports to those affected. The service of this institution will be available to medical practitioners, hospitals, research stations, pharmacists, benefit societies and manufacturers.

CANADA BARS ASPIRIN.

Goods marked with, or in containers which are marked with, the word or trade-mark, "Aspirin," or any palpable imitation thereof are prohibited importation into Canada, according to information sent to the Department of Commerce by the assistant commercial attaché at Ottawa. Acetylsalicylic acid may be imported, provided it is not marked "Aspirin" or any palpable imitation thereof.

SOUTH CAROLINA DRUG STORES.

South Carolina, according to the United States Census Bureau, has 217 drug stores without soda fountains; 319 with soda fountains. The sales of the drug stores without fountains for 1929 amounted to $4,036,730, $2.32 per capita. The stores with fountains, $7,849,138, $4.51 per capita.

SESSIONS OF LEGISLATURES.

Congress meets early in December; Illinois Legislature met November 5th, Pennsylvania November 9th; Wisconsin will soon meet in called session. The following legislatures will convene in regular session in 1932: Kentucky, Louisiana, Mississippi, Virginia, Massachusetts, Rhode Island, New Jersey and South Carolina.

THE MISSISSIPPI CHAIN STORE TAX.

The Mississippi sales and chain store tax law was made ineffective by an injunction pending litigation regarding its constitutionality, the Supreme Court decided in upholding an injunction against the law granted by the Federal court for the southern district of Mississippi.

The Mississippi law provides a tax of one-fourth of one per cent on retail sales of all dealers in the state and an additional one-fourth of one per cent on sales of chains operating five or more stores.

BOOK NOTICES AND REVIEWS.

The Colorimetric and Potentiometric Determination of p_H. By I. M. KOLTHOFF, PH.D., Professor of Analytical Chemistry in the University of Minnesota. John Wiley & Sons Inc., New York City, 1931. XI + 167 pages, 35 figs., 15 x 23 cm. Price $2.25.

This book is a treatise from the pen of a capable and prolific author. In it the fundamentals of acid-base equilibria of solutions, and indicators are discussed as Part I of the volume. The second portion of the book deals with the theory of electrode potentials, the technique of potentiometric measurements, the measurement of hydrogen-ion concentration and potentiometric titrations. The last section of the manual treats of conductometric titrations, to which is appended a practical course embracing the contents of the three divisions of the book.

Although the larger well-known treatises on the subject of hydrogen-ion concentration are well suited for reference purposes, they are not particularly well adapted for use as textbooks for students. Herein this volume fills a very useful requirement. It is a working volume for the student and practical worker in the field. The book serves adequately as guide to lectures and laboratory exercises for a course in this branch of physical chemistry as it is applied to any of the biological sciences. The necessity for such an applied course becomes more cogent each year as a knowledge of the principles of acid-base equilibria places in his hands a most potent tool of investigation. Possibly more applications of the work to specialized fields would increase the interest of the applied student in the text.

The author's style is direct and precise. The student is not inundated by the mathematics. The volume seems to be admirably suited for courses of instruction for advanced students in pharmacy.—JOHN C. KRANTZ, JR.

Studiën over Lunasia amara (Blanco) var. costulata (Hoch.). By DR. E. H. WIRTH. Dissertation, Leiden. 130 pages, 33 illustrations.

Lunasia amara is a small tree indigenous to the Malay and Philippine archipelagoes, purported to have been employed in the manufacture of an arrow poison by the natives of these islands. Considerable discrepancy appears in the literature due to the shipment of one or more lots of *Lophopetalum toxicum*, erroneously labeled *Lunasia amara* to various European laboratories some thirty years ago. For this reason care must be exercised in reviewing the past work as considerable of the work published upon *Lunasia* was in reality done upon *Lophopetalum*. Following a very complete historical introduction and a detailed botanical discussion, the original work is divided into three parts: (1) Pharmacognostical, (2) Phytochemical and (3) Pharmacological. The pharmacognostical part embodies macroscopical and microscopical studies of the bark, wood and leaves. Of especial histological interest are the fibres which are found in all of the parts studied. These fibres are very thick walled and exhibit the peculiar phenomenon of polarizing light only in the middle lamella. The bark shows an abundance of calcium oxalate prisms as well as a distinct endodermis. The wood, being very hard (so hard, in fact, that it has been used by the natives of Luzon to replace iron in the manufacture of their arrow heads) consists primarily of a mass of closely adjacent, very thick-walled fibres, accompanied by very little wood parenchyma, small tracheæ and rather small medullary rays. The leaves exhibit characteristic lignified cluster hairs, a few glandular hairs, considerable calcium oxalate and the usual secretion cells found in the Rutaceæ. Careful measurements are given of the histological elements as well as complete descriptions. The pharmacognostical part is illustrated with four photographs and thirteen drawings. The author has isolated two alkaloids from the bark and wood, (1) lunasin, $C_{18}H_{21}N_2O_5$, m. p. 188°, which is very bitter, soluble in water and rather unstable toward even mild alkalies, and, (2) lunacrin, $C_{16}H_{20}NO_3$, m. p. 116°, which is slightly acrid and pungent, insoluble in cold water and very feebly basic forming salts with mineral acids. Both lunasin and lunacrin are quinolin bases, having methoxy-methyl-quinolin as one nucleus. Both alkaloids show interesting chemical peculiarities among which is their approximate neutrality. The author has studied the pharmacological action of lunasin and lunacrin upon both intact animals and isolated organs. Both alkaloids exhibit a similar physiological action, lunasin, however, being considerably more toxic. They exert no anæsthetic action on sensory or motor nerves and there is no action on the sympathetic ganglion. The alkaloids, however, show a distinct action on muscle evidenced in a continually increasing of tone and a rapid diminution of the power of response of the muscle to stimulation. This action on muscular tissue is seen not only upon isolated voluntary and smooth muscle, but also upon the blood vessel walls where a distinct contraction of the vessel occurs and upon the heart where a distinct diminution in the heart contractions was found. The lethal effect of both alkaloids is due to a stop in the respiration simultaneously with a stop in the circulation. Blood pressure experiments upon anæsthetized, decerebrated and decapitated preparations show principally a drop due to the action on the heart muscle. Lunasin, however, gives a rise in the decapitated preparation showing considerable action on the vasomotor center not shown by lunacrin. Both alkaloids also exhibit a positive toxic action on protozoal organisms. The pharmacological part is illustrated by two graphs and fourteen kymographion tracings. The work has done considerable to clarify the complicated *Lunasia* problem. The pharmacognostical and pharmacological parts are very detailed and complete, exhibiting a keen sense of observation and the careful recording of these observations. The phytochemical part contains important contributions to the knowledge of the *Lunasia* alkaloids. The difficulty of their isolation has been overcome and the author has carried the problem of their structure well along toward its solution.

"The ideal pharmacist is the one who has retained his professional standing and used it to aid him in achieving commercial success. There is no incompatibility between professionalism and commercialism in pharmacy if they are developed side by side; each in its own proportion and not at the expense of the other. It is quite obvious that one cannot become a successful pharmacist unless he is a good business man, but neither can he become a successful pharmacist unless he is a pharmacist."—PROF. C. F. HEEBNER, Toronto.